

# Grade 9 EQAO Assessment of Mathematics

# Applied

## Student Preparation Booklet

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

School: \_\_\_\_\_

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## **Grade 9 EQAO Assessment of Mathematics**

### **Key Words**

Throughout the assessment, key words are used to identify the type of response required from you. The key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

#### **Compare:**

Tell what is the same and what is different.

#### **Describe:**

Use words to create a mental picture for the reader.

#### **Determine:**

Use mathematics to find a solution to the problem.

#### **List:**

Use point form.

#### **Explain:**

Use words and symbols to make your solution clear.

#### **Justify:**

Give reasons and evidence to show your answer is correct.

#### **Show your work:**

Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.

## Tools you should have access to:

- Pencil, ruler and eraser
- Scientific or Graphing calculator (You may not share with another student)
- Manipulatives (examples: fraction pieces, algebra tiles, linking cubes, integer counters, 3D solids, 2D shapes ...)

## Strategies for Multiple Choice Questions:

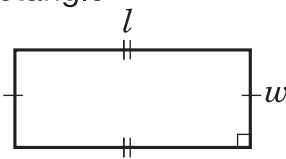
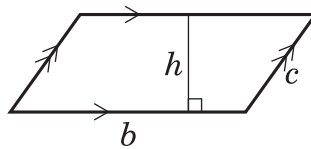
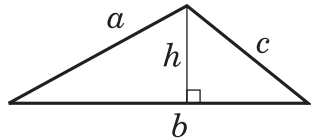
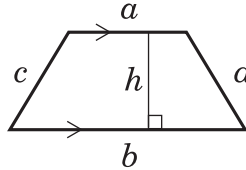
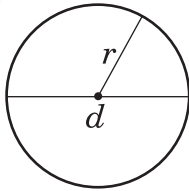
1. Cover the question choices and read the question stem carefully and highlight key words with a highlighter, especially the key words on the previous page.
2. Look at the choices and eliminate any of the responses that are not possible.
3. There is only **one** answer per question. Choose the best possible answer and shade your choice on the answer sheet.
4. Answer every question; there are no penalties for guessing.
5. Questions that have a graph are drawn to scale. Questions that have a diagram are usually not drawn to scale.

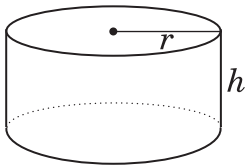
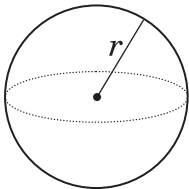
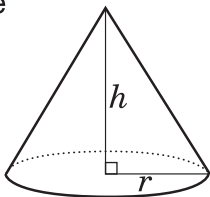
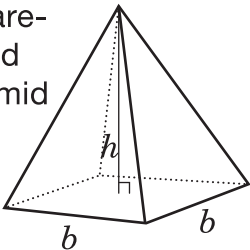
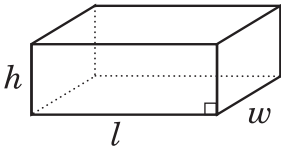
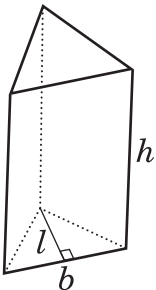
## Strategies for Open Response Questions:

1. These questions are asking you to show what you know and what you can do. Complete solutions including any rough work are expected for these questions. Give as much information as you can.
2. Read the question carefully and highlight any key words or information with a highlighter.
3. Write your solution in the space provided. Try to give a clear well-organized solution to illustrate your complete understanding and ability to communicate. Write your solution so they can be understood by someone who does not know your work.
4. Don't erase any of your calculations, drawing or reasoning. Scorers want to see all your work.
5. Use the list of key words on the previous page to help you decide what is expected in your answer. For example, "show your work" means, *record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.*
6. The problems in these questions often have more than one way of being solved. Be sure to clearly explain your solution using graphs, tables, pictures numbers or words.
7. When using a calculator, write down all the numbers you use and the operations you carry out. For example to find the area of a circle of diameter 7cm you need to write  $A = \pi(3.5)^2 \approx 38.485\text{cm}^2$ .

# Formula Sheet

## Grade 9 Applied

Geometric Figure	Perimeter	Area
<p>Rectangle</p> 	$P = l + l + w + w$ or $P = 2(l + w)$	$A = lw$
<p>Parallelogram</p> 	$P = b + b + c + c$ or $P = 2(b + c)$	$A = bh$
<p>Triangle</p> 	$P = a + b + c$	$A = \frac{bh}{2}$ or $A = \frac{1}{2}bh$
<p>Trapezoid</p> 	$P = a + b + c + d$	$A = \frac{(a + b)h}{2}$ or $A = \frac{1}{2}(a + b)h$
<p>Circle</p> 	$C = \pi d$ or $C = 2\pi r$	$A = \pi r^2$

Geometric Figure	Volume
Cylinder 	$V = (\text{area of base})(\text{height})$  $V = \pi r^2 h$
Sphere 	$V = \frac{4}{3} \pi r^3$ or $V = \frac{4\pi r^3}{3}$
Cone 	$V = \frac{(\text{area of base})(\text{height})}{3}$  $V = \frac{1}{3} \pi r^2 h$ or $V = \frac{\pi r^2 h}{3}$
Square-based pyramid 	$V = \frac{(\text{area of base})(\text{height})}{3}$  $V = \frac{1}{3} b^2 h$ or $V = \frac{b^2 h}{3}$
Rectangular prism 	$V = (\text{area of base})(\text{height})$  $V = lwh$
Triangular prism 	$V = (\text{area of base})(\text{height})$  $V = \frac{1}{2} blh$ or $V = \frac{blh}{2}$

# Applied

## Grade 9 Assessment of Mathematics

2012

### **RELEASED ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the Student Answer Sheet (2012, Applied).**

Education Quality and  
Accountability Office



Please note: The format of  
this booklet is different from  
that used for the assessment.  
The questions themselves  
remain the same.

# Directions






Make sure you have the following materials:

- Student Answer Sheet
- the Formula Sheet
- a pencil and an eraser
- a ruler
- a scientific or graphing calculator
- some paper for rough work for multiple-choice questions only

The diagrams in this booklet are **not** all drawn to scale.

## Answering Multiple-Choice Questions

When answering the multiple-choice questions, be sure you use Student Answer Sheet. The circles you will be filling in are lettered a, b, c, d.

1. Try to answer all of the multiple-choice questions. Be sure to read each question and its four answer choices carefully. Do not spend too much time on any one question.
2. To indicate your answer, **use a pencil to fill in the circle completely** on Student Answer Sheet. Like this:  Not like this:    
3. If you fill in more than one answer to a question, the question will be scored zero.
4. If you leave a question blank, the question will be scored zero.
5. Cleanly erase any answer you wish to change and fill in the circle for your new answer.

## Answering Open-Response Questions

1. Do all of your work (even your rough work) in this booklet.
2. Present a complete and well-organized solution to each question. Give as much information as you can.
3. Write your solutions so that they can be understood by someone who does not know your work.
4. Make sure you follow the directions on the Key Words page.  
For example, a question might ask you to “Show your work.” Read the Key Words page. It says to record all calculations and steps. So, if you sketch a graph in the process of getting to your answer, show the sketch and label it.
5. When using a calculator, write down the numbers you use and the operations you carry out.  
For example, a question might ask you to “Find the area of a circle with a radius of 7 cm.” You need to write  $A = \pi(7)^2$  as well as the answer you get on your calculator.



- 1** Consider the proportion below.

$$\frac{3}{4} = \frac{a}{24}$$

What is the value of  $a$  in the proportion?

- a 6
- b 8
- c 18
- d 72

- 2** A small case of pop, with 12 cans, costs \$3.96. A large case has 18 cans. The cost per can in the large case is \$0.02 less than in the small case.

What is the cost of a large case?

- a \$3.60
- b \$3.72
- c \$5.58
- d \$5.94

- 3** In the first year of a fundraising campaign, donations are collected at a rate of \$700 each day for 8 days.

In the second year, the daily rate doubles and the campaign is 3 days longer.

How much money is raised in the second year?

- a \$4200
- b \$7700
- c \$11 200
- d \$15 400

- 4** In an election for student council president, 480 students vote.

Jade receives 55% of the votes. Ericka receives the rest of the votes.

How many votes does Ericka receive?

- a 216
- b 264
- c 425
- d 435

- 5** Consider the following equation:

$$c^2 = 6^2 + 10^2$$

Which is closest to the value of  $c$ ?

- a 4
- b 6
- c 12
- d 16

- 6** Which expression is a simplified form of

$$3x^2 - 4x + 5 - x^2 + 2x - 1?$$

- a  $2x^2 - 2x + 4$
- b  $2x^2 + 2x + 6$
- c  $4x^2 - 6x + 4$
- d  $4x^2 + 6x + 6$

- 7** For which of the following is  $x = -7$  **not** a solution?
- a**  $4 = x + 11$
  - b**  $3x = x - 28$
  - c**  $5 = -2x - 9$
  - d**  $5x = 2x - 21$



**8 Road Trip!**

Paul drives from home to his friend's house and then back home.

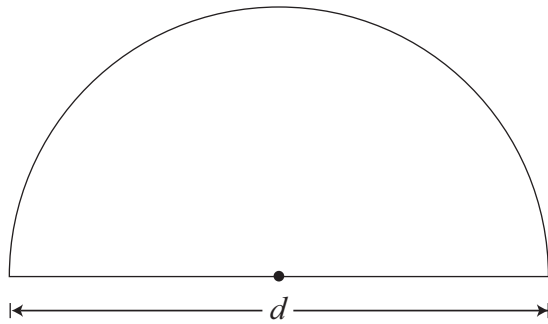
- The distance from Paul's home to his friend's house is about 720 km.
- On average Paul's car uses 6.8 L of gas for every 100 km.
- Gas costs 96.5 cents a litre.

How much does Paul pay in total for gas to his friend's house and back home?

Show your work.

**9 Stage Show**

A stage in the shape of a semicircle is shown below.

**Hint:**

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

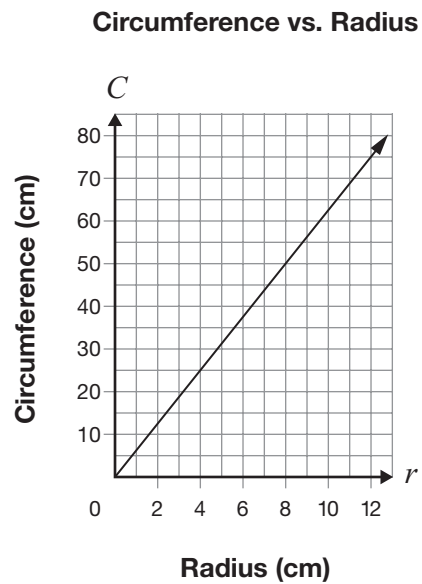
The area of the stage is  $200 \text{ m}^2$ .

Determine the measure of the diameter.

Show your work.



- 10** The graph below represents the relationship between the circumference and the radius of a circle.



Which of the following is represented by this graph?

- a radius = 20 cm; circumference = 3.0 cm
- b radius = 10 cm; circumference = 1.6 cm
- c radius = 9 cm; circumference = 50 cm
- d radius = 7 cm; circumference = 44 cm

- 11** Sanjay makes \$20 per day plus \$8 for every magazine subscription he sells.

Which of the following tables shows data from the relationship between his total daily pay and the number of subscriptions he sells?

a

Number of subscriptions sold	Total daily pay (\$)
0	20
1	28
2	36
3	44
4	52

b

Number of subscriptions sold	Total daily pay (\$)
0	20
1	20
2	20
3	20
4	20

c

Number of subscriptions sold	Total daily pay (\$)
0	8
1	28
2	48
3	68
4	88

d

Number of subscriptions sold	Total daily pay (\$)
0	0
1	8
2	16
3	24
4	32

- 12** William belongs to a music downloading club. He pays \$8 a month plus \$0.50 per song downloaded.

Which of the following shows information about the relationship between the total monthly cost, in dollars, and the number of songs downloaded?

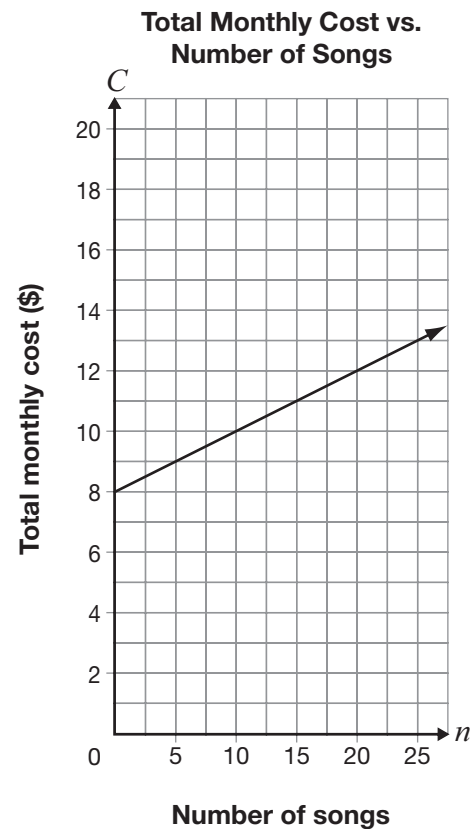
a

Number of songs	Total monthly cost (\$)
10	8.00
20	13.00
30	18.00
40	23.00

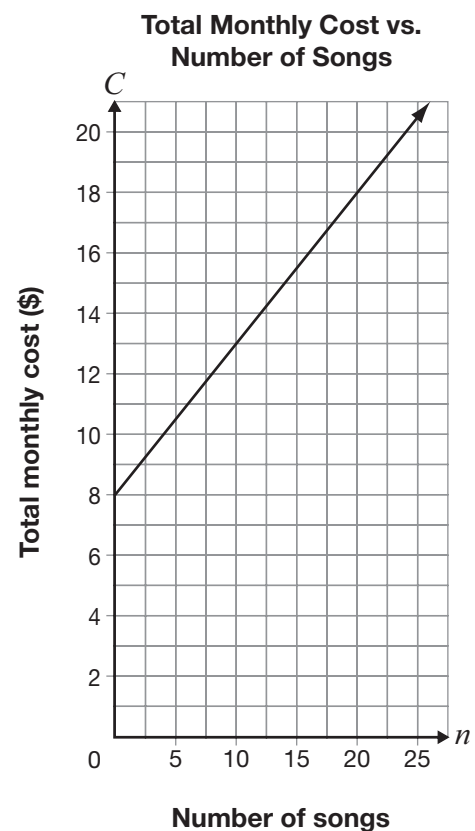
b

Number of songs	Total monthly cost (\$)
0	8.00
10	8.50
20	9.00
30	9.50

c



d

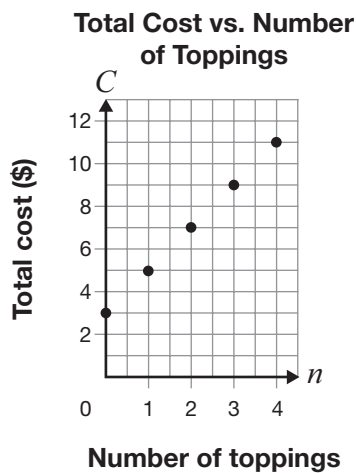


- 13** A restaurant charges \$3 for a cheese pizza plus \$2 per additional topping.

Which of the following shows two models that represent the relationship between the total cost of a pizza,  $C$ , and the number of additional toppings on it,  $n$ ?

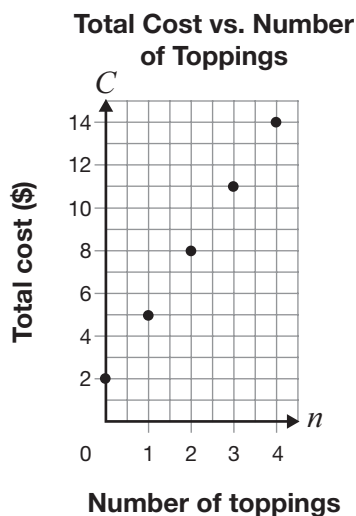
**a**

Number of toppings, $n$	Total cost, $C$ (\$)
0	3
2	7
4	11
6	15



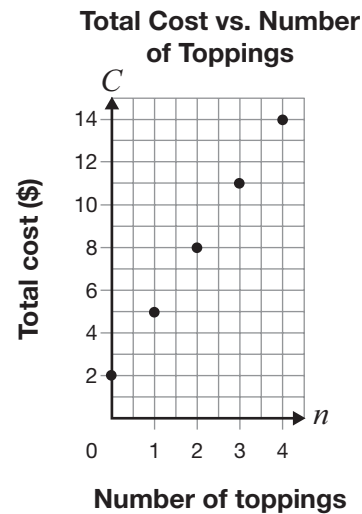
**b**

$$C = 3n + 2$$



**c**

Number of toppings, $n$	Total cost, $C$ (\$)
0	2
2	8
4	14
6	20



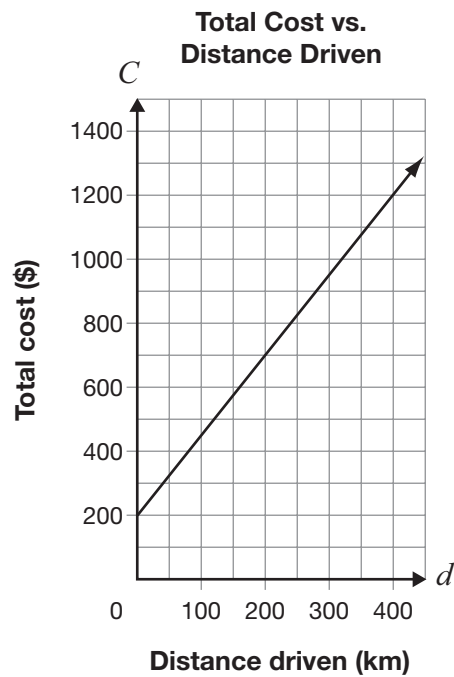
**d**

$$C = 2n + 3$$

Number of toppings, $n$	Total cost, $C$ (\$)
0	2
1	5
2	8
3	11



- 14** A limousine company charges customers according to the graph shown below.



What rate does the company charge per kilometre?

- a \$1.25
- b \$2.50
- c \$200.00
- d \$400.00

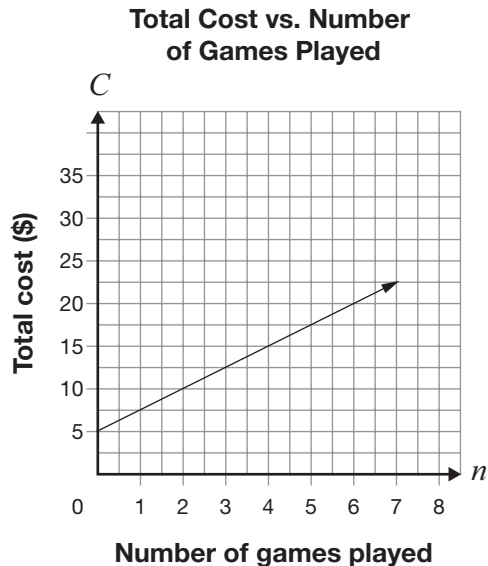
- 15** A basketball club offers two types of memberships.

- Membership Y: No registration fee and \$15 per hour for court time.
- Membership Z: \$40 registration fee and \$5 per hour for court time.

Which of these relationships is a partial variation, and what is its initial cost?

- a Membership Y; \$0
- b Membership Y; \$15
- c Membership Z; \$5
- d Membership Z; \$40

- 16** An arcade charges each customer an admission fee plus a cost to play each game. The relationship between the total cost,  $C$ , and the number of games played,  $n$ , is shown on the grid below.



Which equation below represents this relationship?

- a  $C = 0.5n + 5$
- b  $C = 0.5n + 7.5$
- c  $C = 2.5n + 5$
- d  $C = 2.5n + 7.5$

- 17** The table below shows information about the linear relationship between the total cost per month of Sylvie's cellphone plan and the number of text messages she sends.

Month	Number of text messages	Total cost (\$)
January	60	28
February	20	24
March	30	?

According to this relationship, what is Sylvie's total cost for March?

- a \$14
- b \$20
- c \$25
- d \$26

- 18** The table below shows the relationship between the cost to rent a bicycle,  $C$ , and the number of hours,  $n$ .

Number of hours, $n$	Rental cost, $C$ (\$)
0	10
1	13
2	16
3	19

Which equation represents this relationship?

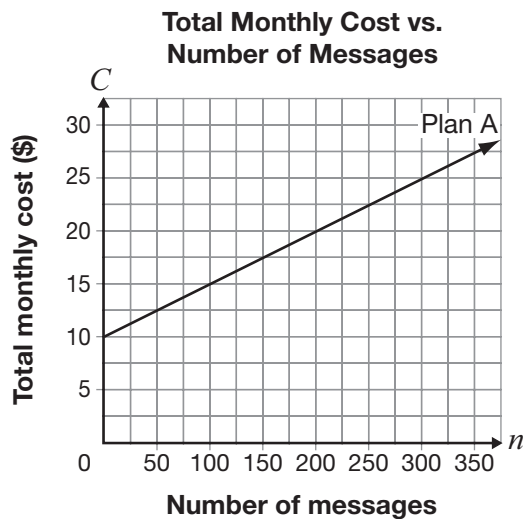
- a  $C = 3n$
- b  $C = 10n$
- c  $C = 3 + 10n$
- d  $C = 10 + 3n$

- 19** A taxi charges a flat fee of \$3.75, plus \$1.50 per kilometre driven.

What is the total cost of a 10 km trip?

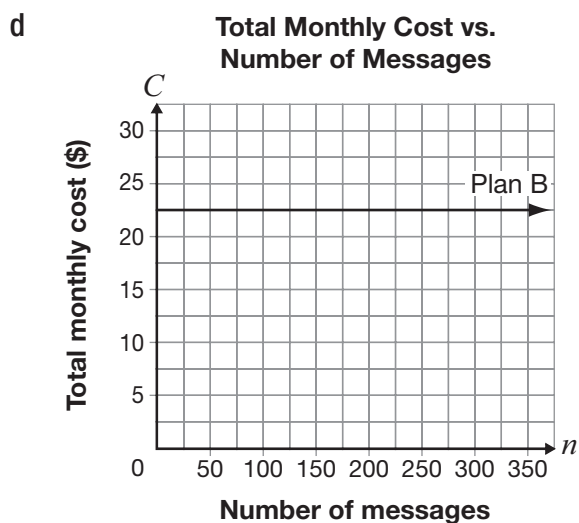
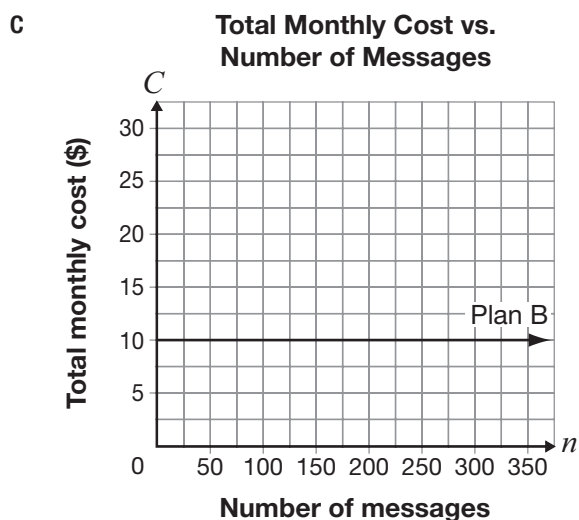
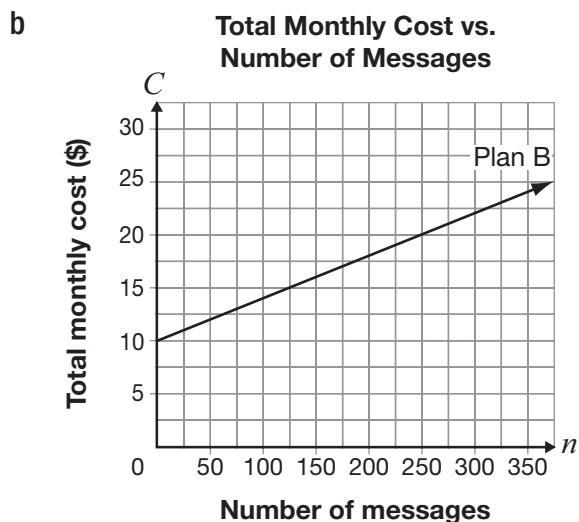
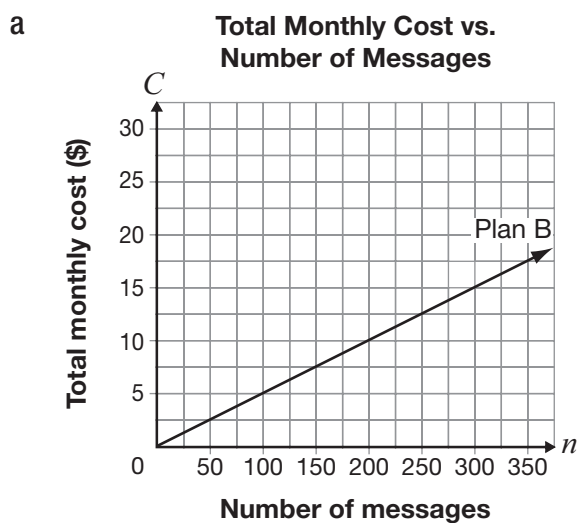
- a** \$15.00
- b** \$18.75
- c** \$39.00
- d** \$52.50

- 20** Kris is considering a new text message plan. The graph below shows information about Plan A.



Plan B has the same total monthly cost for 250 messages.

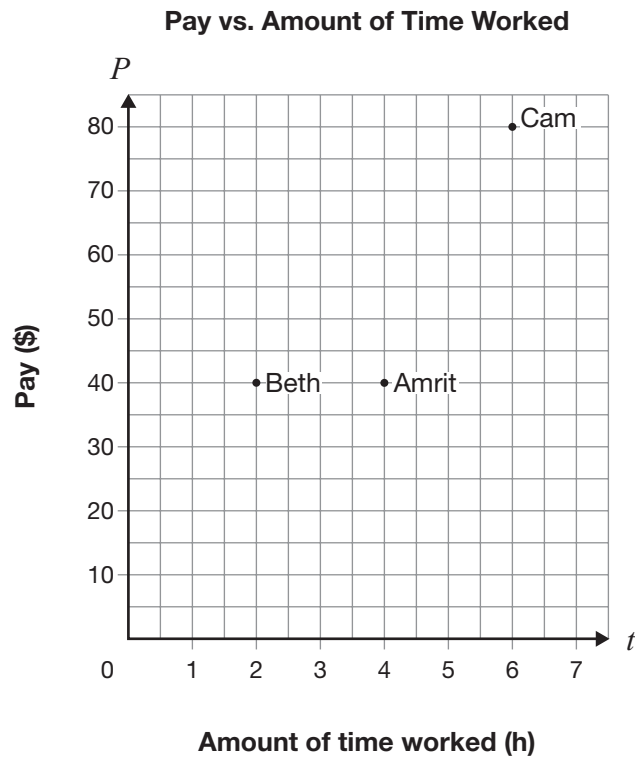
Which of the following graphs could represent Plan B?



**21 Student Work**

Cam, Beth and Amrit are paid at an hourly rate for their time worked.

The graph below shows the amount paid and the time worked for these three students.



Determine which student is paid the highest hourly rate.

Justify your answer.

The student who is paid the highest hourly rate is \_\_\_\_\_.

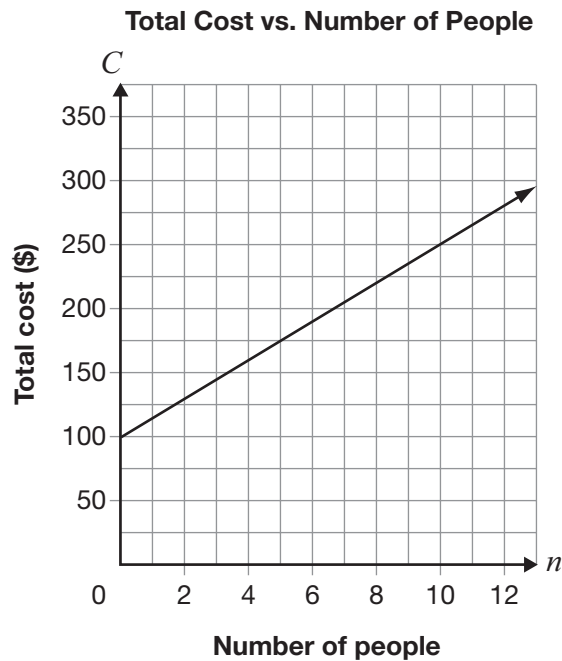
**22 Rental Rates**

The total cost of a banquet includes a fixed fee to rent the hall and a cost per person.

Information about the total cost at two different halls is shown below.

**Hall A**

Number of people, $n$	Total cost, $C$ (\$)
10	275
20	450
30	625

**Hall B**

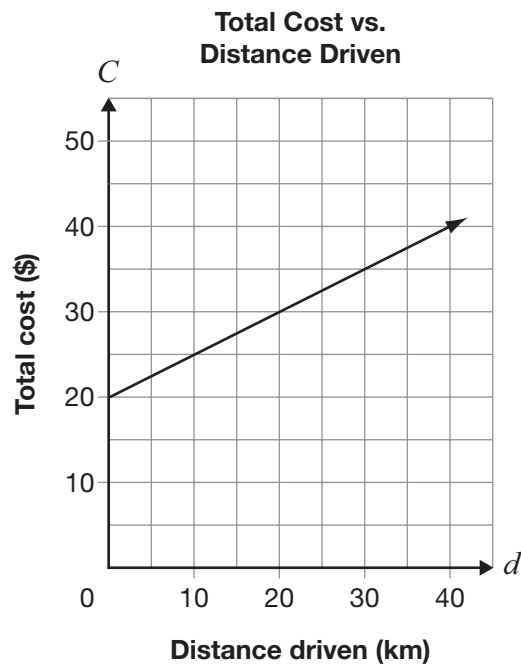
Which hall's total cost includes a lower cost per person?

Circle one:    Hall A        Hall B

Justify your answer.

**23 Requesting All Rentals!**

Erin rents a car. The relationship between the total cost of the rental and the distance driven is shown by the graph below.



Use the graph to estimate the total cost of the rental if Erin drives 27 km. Show your work on the graph.

The estimated cost for 27 km is \_\_\_\_\_.

Using the equation  $C = 20 + 0.5d$ , where  $C$  represents the total cost, in dollars, and  $d$  represents the distance Erin drives, in kilometres, determine the total cost of driving 27 km.

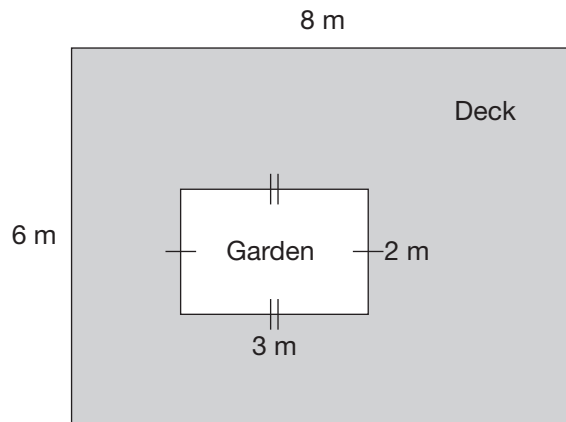
Show your work.

The actual cost for 27 km is \_\_\_\_\_.

There could be a difference in the total cost of driving 27 km when you use the graph rather than the equation.

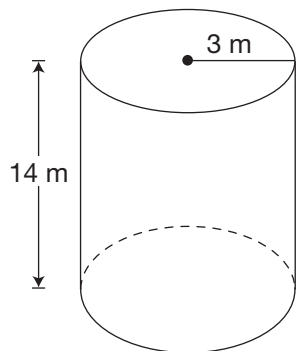
Explain why there could be a difference.

- 24** Ollie constructs a rectangular deck. He builds the deck around a garden in his yard as shown below.



What is the area of the deck?

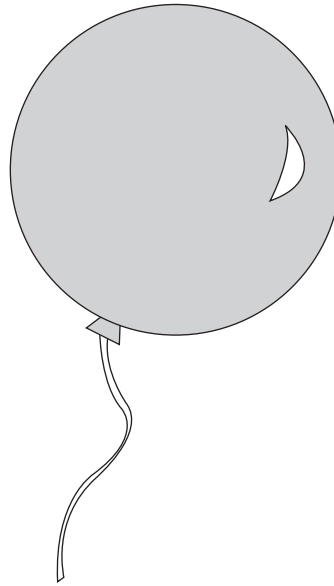
- a  $48 \text{ m}^2$
  - b  $42 \text{ m}^2$
  - c  $20 \text{ m}^2$
  - d  $18 \text{ m}^2$
- 25** Consider the cylinder below.



Which of the following is closest to the volume of the cylinder?

- a  $126 \text{ m}^3$
- b  $132 \text{ m}^3$
- c  $264 \text{ m}^3$
- d  $396 \text{ m}^3$

- 26** Air is pumped to fill a spherical balloon. Each time air is pumped,  $300 \text{ cm}^3$  of air enters the balloon.

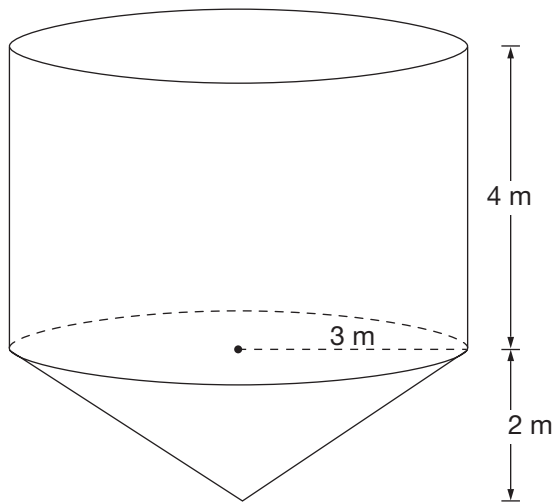


Which of the following is closest to the number of times air must be pumped to fill an empty spherical balloon to a radius of 10 cm?

- a 4
- b 14
- c 30
- d 42

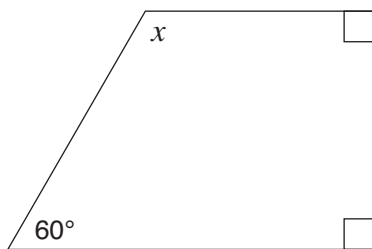


- 27** A container that stores grain is in the shape of a cylinder and cone as shown below.



Which is closest to the volume of the container?

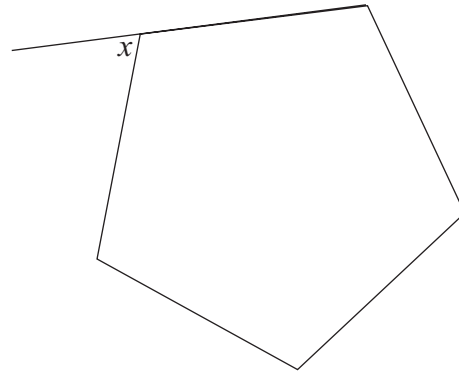
- a  $88 \text{ m}^3$
  - b  $113 \text{ m}^3$
  - c  $132 \text{ m}^3$
  - d  $170 \text{ m}^3$
- 28** Consider the diagram below.



What is the value of  $x$ ?

- a  $30^\circ$
- b  $60^\circ$
- c  $120^\circ$
- d  $150^\circ$

- 29** A regular pentagon is shown below.

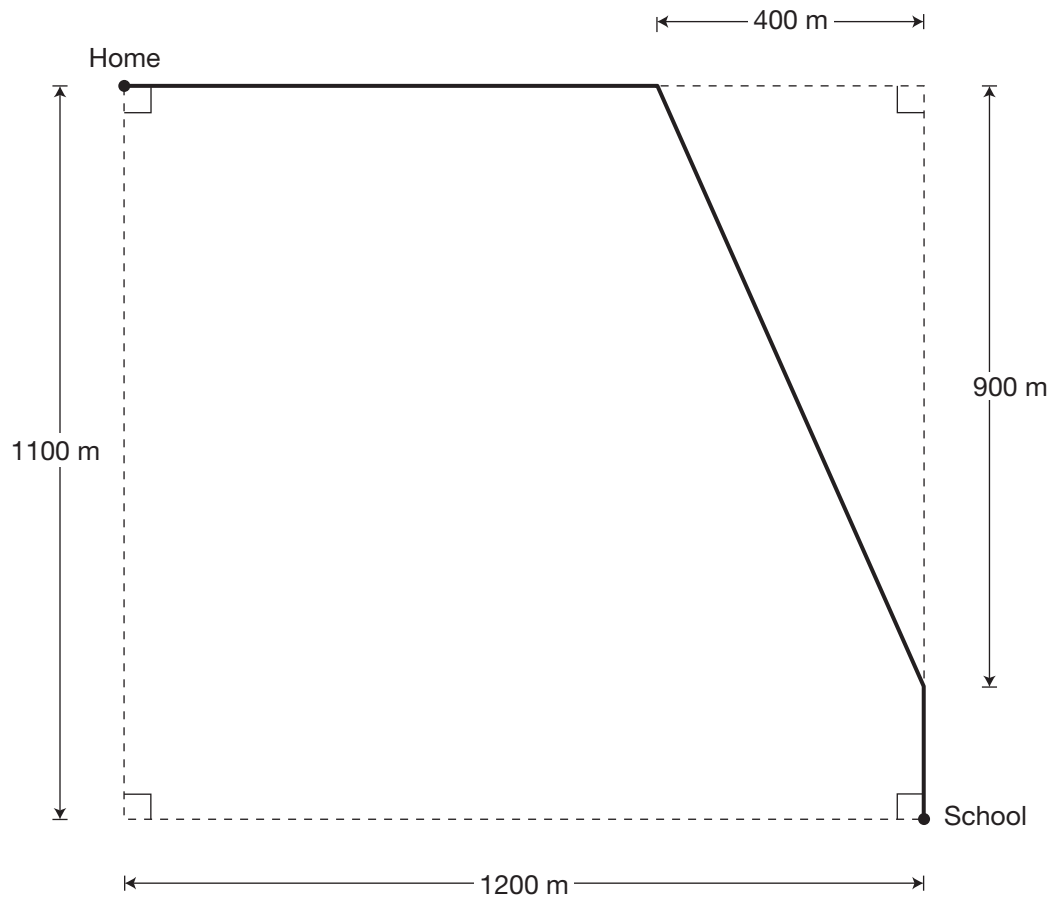


What is the value of  $x$ ?

- a  $60^\circ$
- b  $72^\circ$
- c  $108^\circ$
- d  $180^\circ$

**30 School's In**

Chandra uses the map below to determine the distance from home to school.

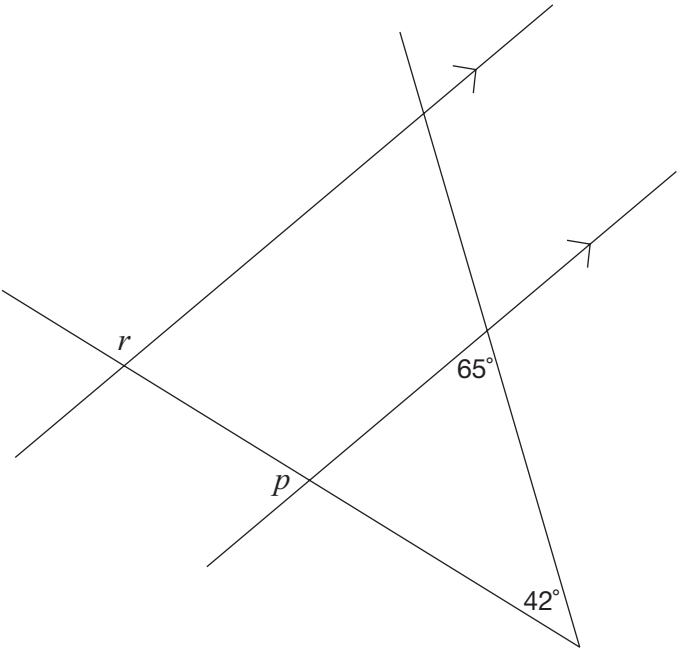


Determine the total distance she will travel from home to school if she walks along the dark, solid lines shown on the map.

Show your work.

31 Angle, Angle

Consider the diagram below.



Complete the chart below with the values for  $p$  and  $r$ . Justify your answers using geometric properties.

Value	Justification using geometric properties
$p =$ _____	
$r =$ _____	



## Released Assessment Questions: Applied

### Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, **use a pencil to fill in the circle completely.**

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ⊙

- Do not fill in more than one answer to a question.
- Do not leave a question blank.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
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4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
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8. Respond in booklet.

9. Respond in booklet.
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17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
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21. Respond in booklet.
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27. (a) (b) (c) (d)
28. (a) (b) (c) (d)
29. (a) (b) (c) (d)
30. Respond in booklet.
31. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_



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# Applied

## Grade 9 Assessment of Mathematics

2011

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the Student Answer Sheet (2011, Applied).**

Education Quality and  
Accountability Office



September 2012

Please note: The format of  
this booklet is different from  
that used for the assessment.  
The questions themselves  
remain the same.

Page 31 of 78

# Directions

Make sure you have the following materials:

- Student Answer Sheet
- the Formula Sheet
- a pencil and an eraser
- a ruler
- a scientific or graphing calculator
- some paper for rough work for multiple-choice questions only

The diagrams in this booklet are **not** all drawn to scale.

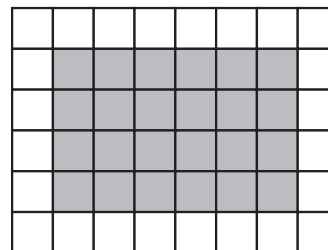
## Answering Multiple-Choice Questions


When answering the multiple-choice questions, be sure you use the Student Answer Sheet. The circles you will be filling in are lettered a, b, c, d.

1. Try to answer all of the multiple-choice questions. Do not leave a question blank.
2. Be sure to read each question and its four answer choices carefully. When you choose an answer, fill in the appropriate circle on the Student Answer Sheet. Do not spend too much time on any one question.
3. Mark only one answer for each question. Do not fill in more than one circle for a question.
4. To make a correction, cleanly erase the answer you wish to change and fill in the circle for your new answer.
5. Now do the following sample question. Fill in your choice in the sample row.

## Sample Question

- 1** Find the area of the shaded region of the rectangle below.



 1 square unit

- a** 16 square units
- b** 24 square units
- c** 30 square units
- d** 36 square units

## Sample Row on Answer Sheet

1.    ☐ a   ☐ b   ☐ c   ☐ d

You should have filled in ☒ b.



- 1** The dimensions of a rectangle are in a 3:5 ratio. If the shorter side lengths are 30 cm, what are the lengths of the longer sides?

a 10 cm  
b 15 cm  
c 18 cm  
d 50 cm

- 2** The table below shows information about renting movies from four different stores.

Name of store	Total cost (\$)	Number of movies rented
Great Flix	6	2
Net Show	12	3
Movie Time	25	10
DVDs R Us	36	12

Which store offers the lowest cost per movie?

a Great Flix  
b Net Show  
c Movie Time  
d DVDs R US

- 3** The table below shows the price per case of water at different stores.

Store	Price per case	Number of 500 mL bottles per case
Cheapies	\$1.75	8
Foodsmart	\$2.25	12
Variety Foods	\$4.59	20
Super Grocers	\$4.99	24

Evelyn is buying 120 bottles of water.

At which store should Evelyn buy her water to pay the least?

a Cheapies  
b Foodsmart  
c Variety Foods  
d Super Grocers

- 4** The cost of an MP3 player is \$299. A newer model costs 20% more.

Which of the following is closest to the sale price of the newer model after a 30% discount?

a \$251.16  
b \$269.10  
c \$289.00  
d \$310.96

**5** What is the value of the expression  $\frac{-12}{-6 + 3}$ ?

- a  $\frac{1}{4}$
- b  $\frac{4}{3}$
- c 4
- d 5

**6** Which value of  $x$  makes the equation  $1 + \sqrt{x} = 10$  true?

- a 3
- b 9
- c 18
- d 81

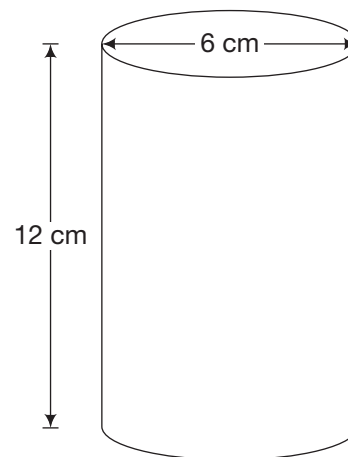
**7** The equation  $d = 3.6 \times \sqrt{h}$  represents the relationship between the distance,  $d$ , that a person can see in an open field, in kilometres, and the person's height,  $h$ , in metres.

One afternoon, Amy can see a distance of 4.5 km.

Which of the following is closest to Amy's height?

- a 1.1 m
- b 1.6 m
- c 2.1 m
- d 2.5 m

**8** A candle made of wax is in the shape of a cylinder.



**Hint:**

$$V = \pi r^2 h$$

Which is closest to the total amount of wax to make the candle?

- a  $226 \text{ cm}^3$
- b  $339 \text{ cm}^3$
- c  $452 \text{ cm}^3$
- d  $1357 \text{ cm}^3$

**9** Which expression is a simplified form of  $-2x(-4x + 3)$ ?

- a  $8x^2 - 6x$
- b  $8x^2 + 6x$
- c  $-8x^2 - 3$
- d  $-8x^2 + 3$

**10 Guzzling Gas**

David and Shaunese each take a 450 km trip.

- David drives a car and uses 7 L of gas per 100 km.
- Shaunese drives a truck and uses 12 L of gas per 100 km.

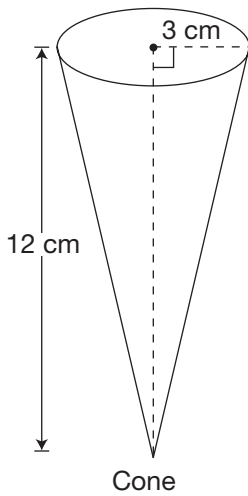
If gas costs \$0.90/L, how much more will it cost Shaunese than David to drive 450 km?

Show your work.

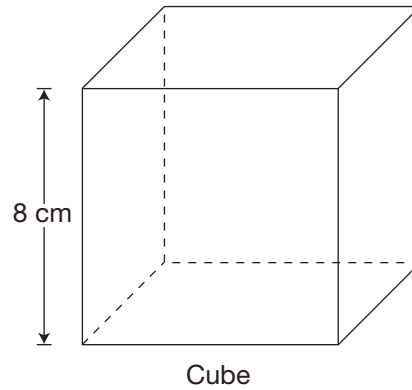


**11 Juggling Juice**

Juice is sold in two different containers, a cone and a cube, as shown below.



$$\text{Volume} = \frac{\pi r^2 h}{3}$$



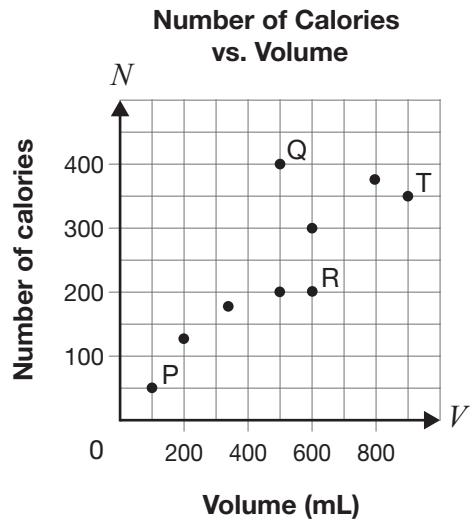
$$\text{Volume} = l^3$$

Which container holds more juice?

Circle one:      Cone              Cube

Show your work.

- 12** The graph below represents the relationship between the number of calories and the volume for various drinks.



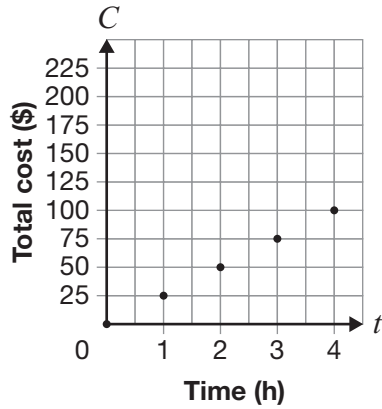
Which of the following points represents a drink with more calories than expected for its volume?

- a P
- b Q
- c R
- d T

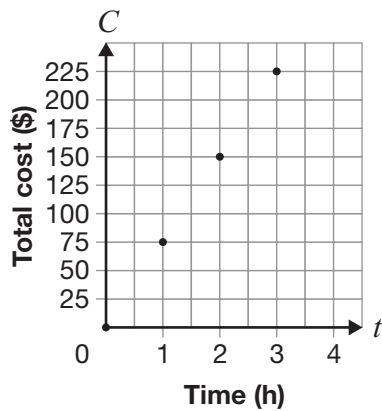


- 13** A plumber charges an initial fee of \$50, plus an additional \$25 per hour.
- Which graph represents this relationship?

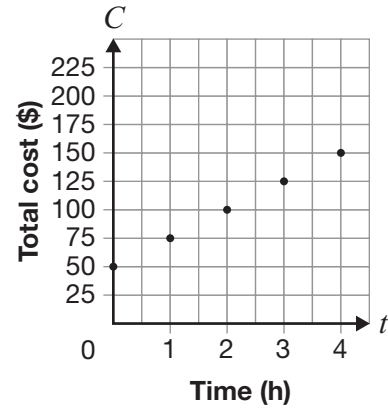
**a** Total Cost vs. Time



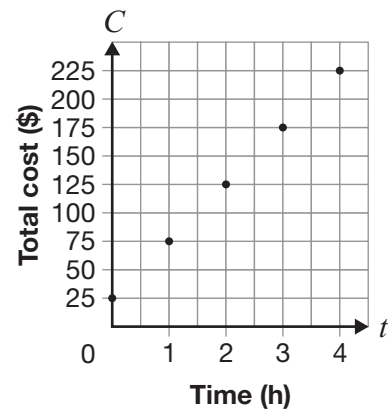
**b** Total Cost vs. Time



**c** Total Cost vs. Time



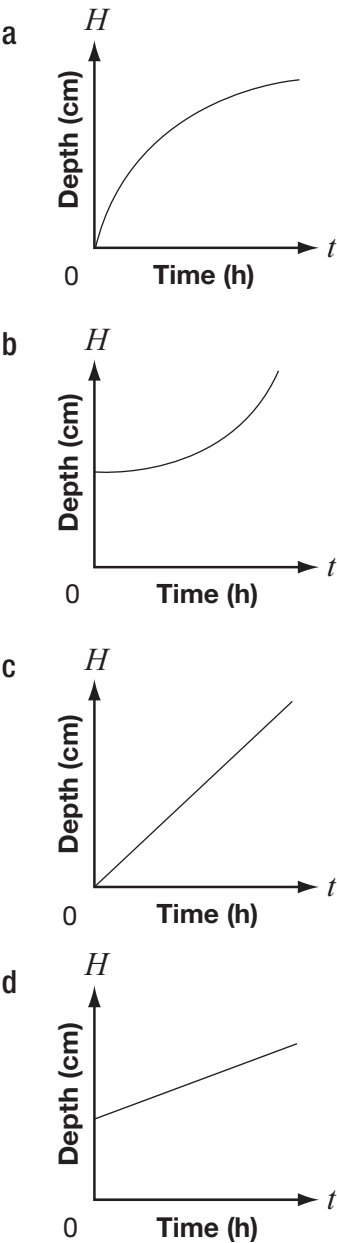
**d** Total Cost vs. Time



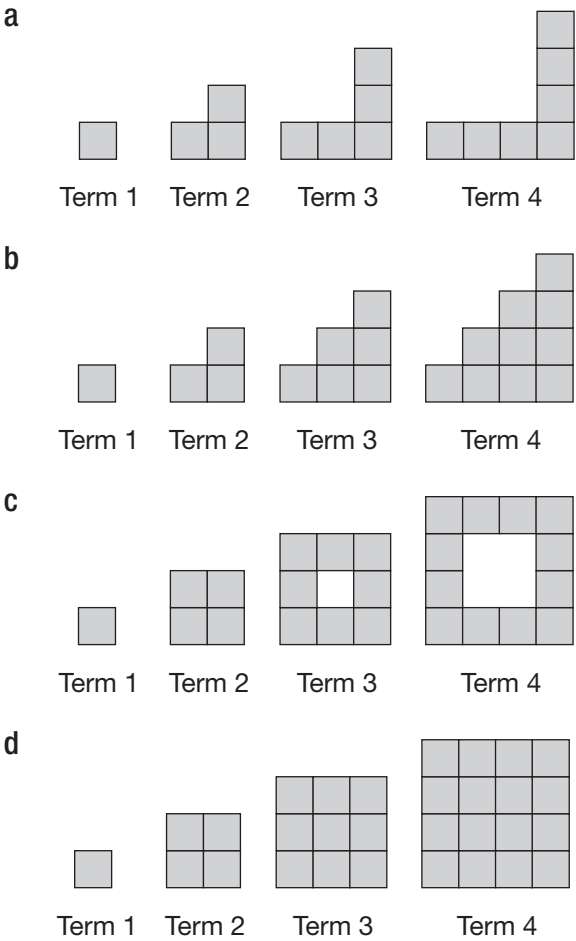
- 14** A snowstorm lasts for seven hours. Data is recorded for the depth of snow for the first five hours.

Time (h)	Depth of snow (cm)
0	5
1	8
2	11
3	14
4	17
5	20

Which graph below best models the depth of snow during the five hours?



- 15** In which of the following patterns is there a linear relationship between the number of shaded squares and the term number?



- 16** An online music store provides music that members can download. The store charges a membership fee and a cost per song.

The chart below represents the relationship between the total cost and the number of songs downloaded.

Number of songs	Total cost (\$)
10	13
20	16
30	19

Which of the following is **not** true about this relationship?

- a It is non-linear.
- b It has an initial cost.
- c It has a constant rate of change.
- d It can be represented by a straight line.

- 17** At her fitness club, Joanne is charged \$15 per month. The total cost for 12 months is \$270.

Is the relationship between the total cost and the number of months a direct or a partial variation, and what is the initial fee?

- a direct variation, \$0
- b direct variation, \$180
- c partial variation, \$15
- d partial variation, \$90

- 18** The total cost for printing a classified advertisement in a local newspaper is made up of a \$30 fee, plus \$0.10 per word.

Which equation below models the relationship where  $C$  is the total cost to place the advertisement and  $w$  is the number of words?

- a  $C = 10 + 0.30w$
- b  $C = 10 + 30w$
- c  $C = 30 + 10w$
- d  $C = 30 + 0.10w$

- 19** Pablo has a cellphone. The relationship between his total monthly cost,  $C$ , in dollars, and the number of minutes he uses the phone,  $t$ , is represented by the equation  $C = 20 + 0.25t$ .

Which of the following is **not** true about this relationship?

- a The cost per minute is \$0.25.
- b The value of the rate of change is 0.25.
- c The total monthly cost for 1 minute is \$20.
- d The graph of the relationship has a  $C$ -intercept of 20.

- 20** The equation  $C = 15n + 100$  represents the relationship between the total cost of a gym membership,  $C$ , in dollars, and the number of months of membership,  $n$ .

Which statement about this gym membership is true?

- a It has an initial cost of \$15.
- b It costs \$115 per month.
- c It has an initial cost of \$15 and a fee of \$100 per month.
- d It has an initial cost of \$100 and a fee of \$15 per month.

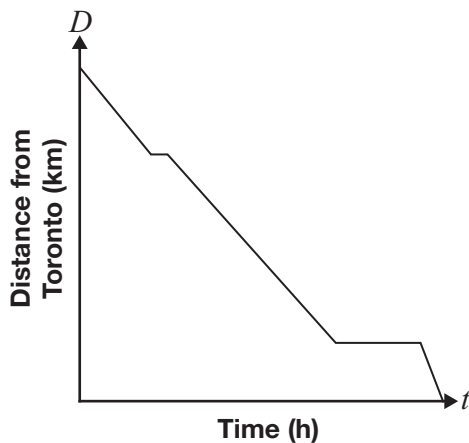


**21** The following describes Ihab's drive from Windsor to Toronto:

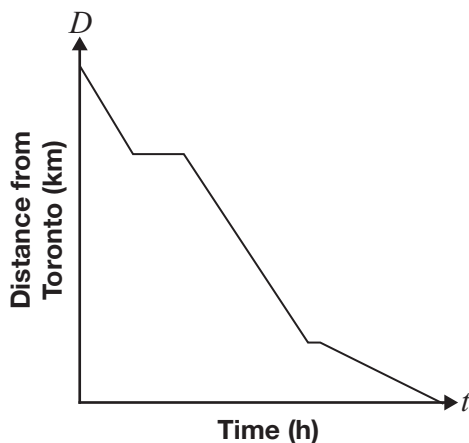
- One hour after leaving Windsor, he stops for 15 minutes to have a snack.
- He then drives for two more hours and then stops to visit a friend for one hour.
- He then completes his drive to Toronto at a faster rate than any other segment of his trip.

Which graph best describes his trip?

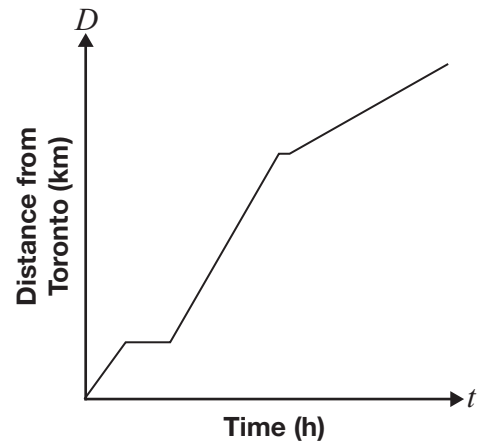
**a** Distance from Toronto vs. Time



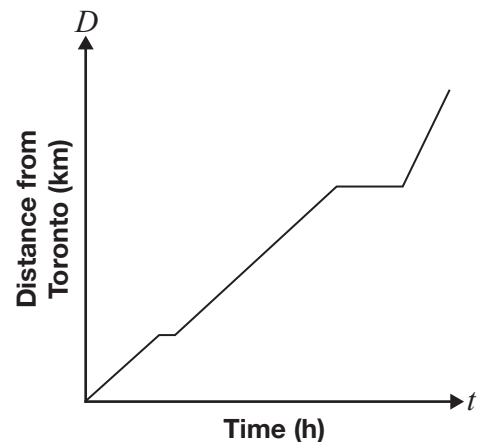
**b** Distance from Toronto vs. Time



**c** Distance from Toronto vs. Time



**d** Distance from Toronto vs. Time



**22** Dan needs to get his car fixed.

- Fast Freddie charges \$440 for materials, plus \$50 per hour for labour.
- Rapid Ron charges \$360 for materials, plus \$60 per hour for labour.

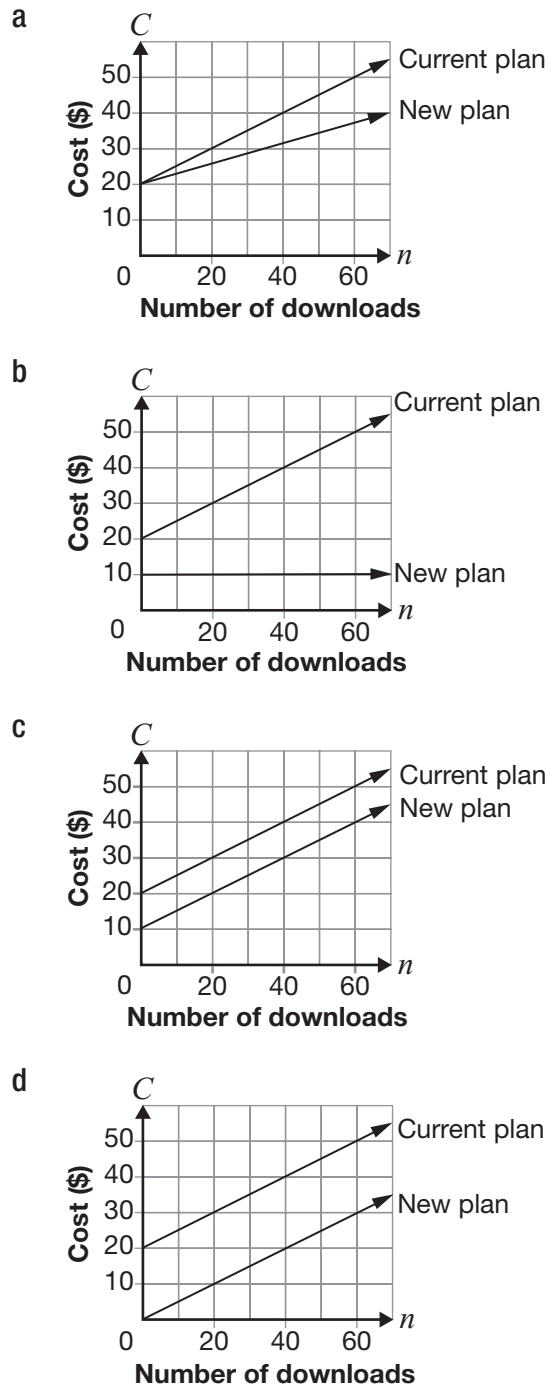
Which repair shop charges less for a 5-hour job, and how much less?

- Rapid Ron charges \$80 less.
- Fast Freddie charges \$30 less.
- Rapid Ron charges \$30 less.
- Fast Freddie charges \$10 less.

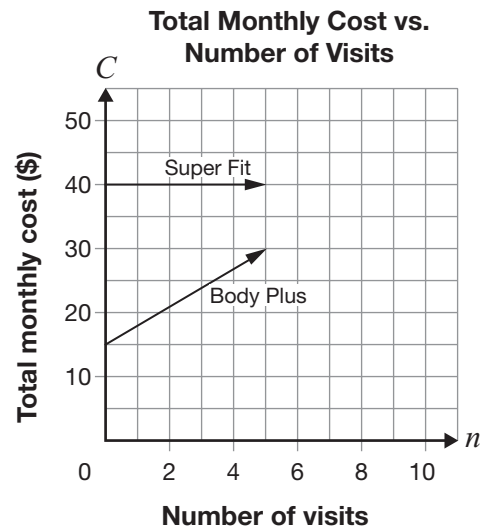
- 23** The current plan for downloading music is made up of a flat fee of \$20 and a fee of \$0.50 per download.

A new plan is made up of a flat fee of \$10 and a fee of \$0.50 per download.

Which graph represents both plans?



- 24** Two health clubs, Super Fit and Body Plus, offer monthly memberships. The total monthly cost for each club is represented by the graphs below.

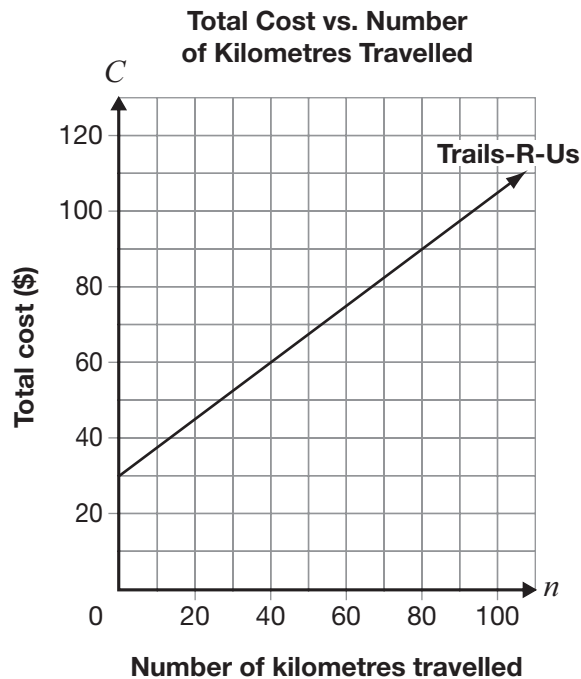


Which of the following is true?

- a** Body Plus is always cheaper.
- b** Super Fit is always more expensive.
- c** Super Fit is cheaper if the number of visits is fewer than 7.
- d** Body Plus is more expensive if the number of visits is greater than 9.

- 25** Corrina wants to rent a snowmobile for a day and considers two rental companies.

The relationship between the total cost of renting from Trails-R-Us and the number of kilometres travelled is represented by the graph below.



Off-Roads charges a flat rate of \$90 for a day with unlimited kilometres.

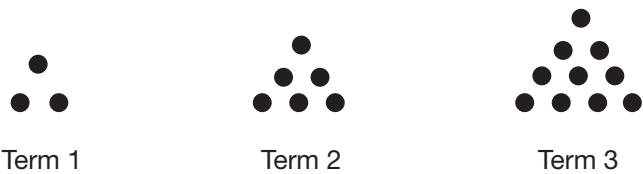
At how many kilometres is the total cost the same at both rental companies?

- a 70 km
- b 80 km
- c 90 km
- d 100 km



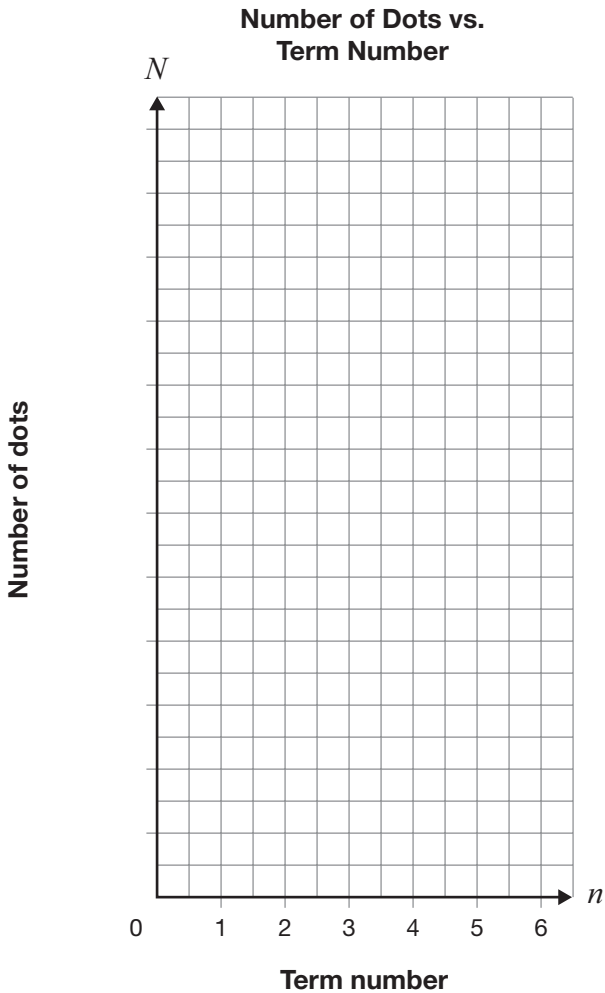
26 Stack It

Juan draws the first three terms of a pattern as shown below.



The pattern continues to grow in the same way. Complete the following table according to the pattern.

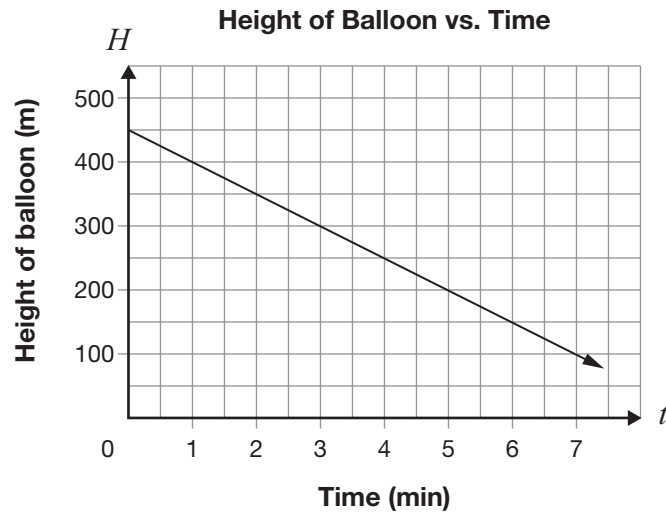
Term number, $n$	Number of dots, $N$
1	3
2	6
3	
4	
5	
6	



Graph the data from the table on the grid above. Add a scale for the  $N$ -axis.  
Draw a line or curve of best fit for the data.

**27 Balloon Ride**

The relationship between the height of a hot-air balloon,  $H$ , in metres, and time,  $t$ , in minutes, is represented below.



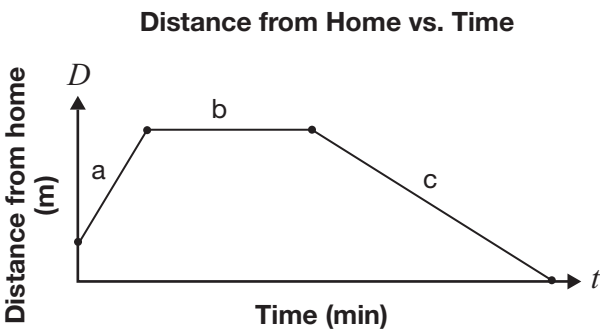
Determine an equation to represent the relationship between the height of the balloon and time.

$$H = \underline{\hspace{4cm}}$$

Show your work.

**28 Walk This Way**

Mauro takes a walk. The graph below shows the relationship between Mauro’s distance from home and his walking time.



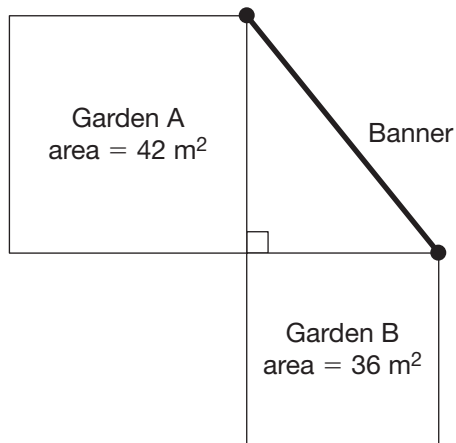
In the table below, compare Mauro’s distance from home, his speed and the direction in which he is travelling in the various segments of his walk.

Segment of graph	Comparison to other segments
a	
b	
c	

- 29** Which dimensions produce the smallest perimeter for a rectangular area of  $120 \text{ m}^2$ ?

a  $2 \text{ m} \times 60 \text{ m}$   
b  $3 \text{ m} \times 40 \text{ m}$   
c  $4 \text{ m} \times 30 \text{ m}$   
d  $6 \text{ m} \times 20 \text{ m}$

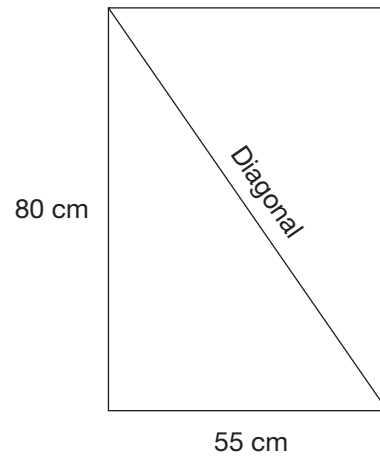
- 30** Two square gardens are shown below. A welcome banner extends from a corner of Garden A to a corner of Garden B.



Which is closest to the length of the banner?

a 6 m  
b 9 m  
c 12 m  
d 78 m

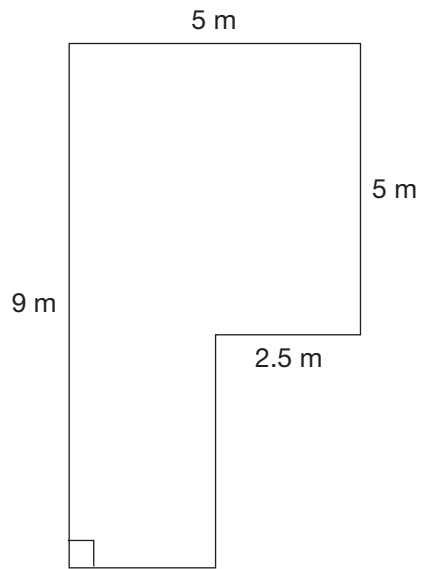
- 31** Use the Pythagorean theorem to find the length of the diagonal in the rectangle below.



Which is closest to the length of the diagonal?

a 135 cm  
b 97 cm  
c 66 cm  
d 58 cm

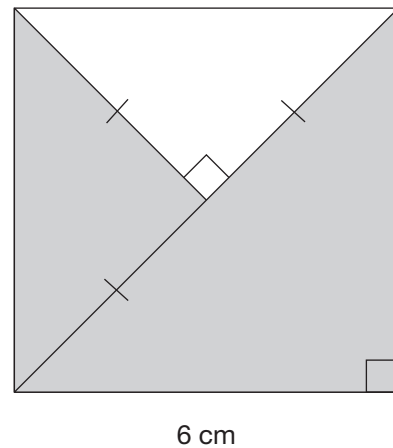
- 32** Hanna works painting sealant on driveways. She charges \$7.50/m<sup>2</sup>.



How much will she charge to paint the driveway shown above?

- a \$215.00
- b \$262.50
- c \$280.00
- d \$337.50

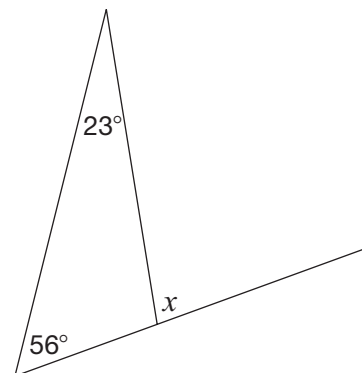
- 33** Consider the square below.



What is the area of the shaded part of the square?

- a 36 cm<sup>2</sup>
- b 27 cm<sup>2</sup>
- c 18 cm<sup>2</sup>
- d 9 cm<sup>2</sup>

- 34** Consider the diagram below.

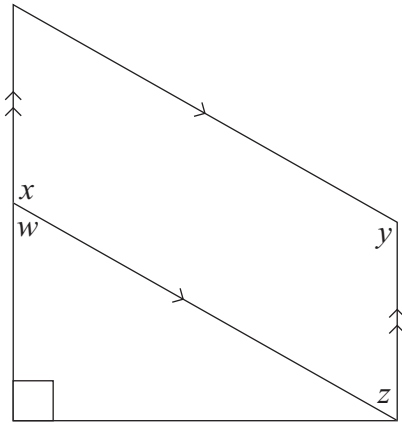


What is the value of  $x$ ?

- a 23°
- b 56°
- c 79°
- d 101°



**35** Consider the diagram below.



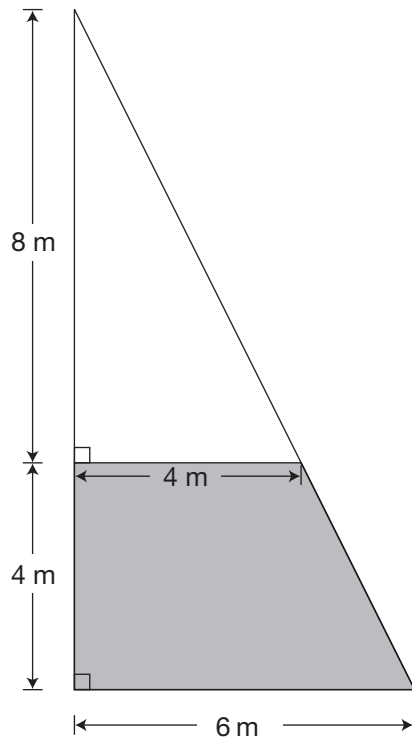
Which equation is true?

- a**  $x = z$
- b**  $w = y$
- c**  $y + z = 180^\circ$
- d**  $w + z = 180^\circ$



**36 Wind in My Sails**

A sail for a sailboat is represented below.



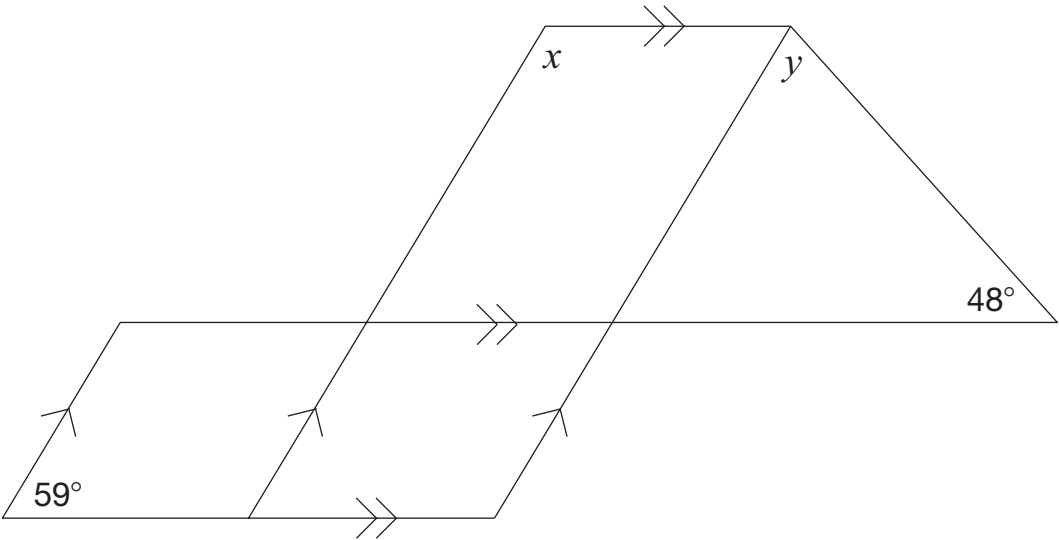
The unshaded part of the sail is made with material that costs  $\$32/\text{m}^2$ .  
The shaded part of the sail is made with material that costs  $\$125/\text{m}^2$ .

Determine the total cost of the sail.

Show your work.

**37    Designing**

Consider the design below.



Complete the table below with the values of  $x$  and  $y$ .

Justify your answers using geometric properties.

Value	Justification using geometric properties
$x =$ _____	
$y =$ _____	



# Sample Assessment Questions: Applied

## Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, **use a pencil to fill in the circle completely.**

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- Do not fill in more than one answer to a question.
- Do not leave a question blank.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
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37. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_



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# Applied

## Grade 9 Assessment of Mathematics

2010

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the Student Answer Sheet (2010, Applied).**

Education Quality and  
Accountability Office



September 2012

Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

Page 55 of 78

- 1** Tommy uses the proportion below to determine the amount of butter,  $x$ , to use with 120 grams of sugar in his cookie recipe.

$$\frac{2}{3} = \frac{x}{120}$$

How many grams of butter does Tommy need?

- a 40
- b 80
- c 180
- d 240

- 2** The chart below shows the mass and the cost for different brands of cookies.

Brand	Mass (g)	Cost (\$)
1	200	1.99
2	250	2.29
3	300	2.89
4	450	4.29

Which brand costs the least per gram?

- a Brand 1
- b Brand 2
- c Brand 3
- d Brand 4

- 3** Tierney goes to the movie theatre and has \$20 to spend on treats.

Soft drink	\$2.29
Chocolate bars	\$1.69
Popcorn	\$3.49

She buys two soft drinks, a chocolate bar and popcorn. She also pays 13% tax.

How much change should Tierney receive from her \$20?

- a \$8.97
- b \$9.76
- c \$11.03
- d \$11.55

- 4** There are 260 Grade 9 students at a high school and 80% of these students attend a dance. Half the Grade 9 students who attend the dance buy their tickets at the door.

How many Grade 9 students who attend the dance buy their tickets at the door?

- a 40
- b 104
- c 130
- d 208

- 5** Which expression represents the volume of a cube with a side length of  $x$ ?

- a  $x^2$
- b  $x^3$
- c  $3x$
- d  $6x$



- 6** What is the value of the expression  $\left(\frac{x}{3}\right)^2$  when  $x = 18$ ?
- a 2
  - b 12
  - c 36
  - d 108
- 7** The cost of a phone call at a hotel is determined by the formula  $C = 0.35t + 0.6$  where  $C$  is the cost, in dollars, and  $t$  is the length of the call, in minutes.
- What is the length of a call that costs \$5.85?
- a 3 minutes
  - b 6 minutes
  - c 15 minutes
  - d 18 minutes



**8 Fill 'Er Up**

The table below shows the cost of water for three customers. They each pay the same cost per litre.

Amount (L)	Cost (\$)
10 000	8.60
20 000	17.20
30 000	25.80

Frank pays \$36.12 for water at the same rate.

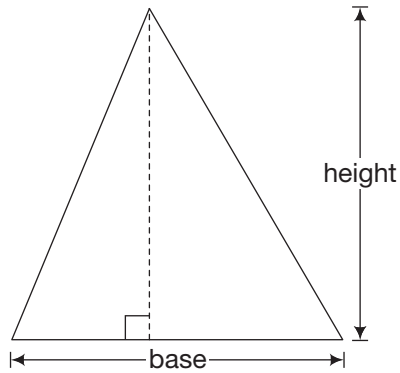
Determine the number of litres of water that he purchases.

Show your work.



**9 Sail Away**

Alain designs a sail in the shape of a triangle for a boat.



The base and height are equal. The area of the sail is  $18 \text{ m}^2$ .

Determine the height of the sail.

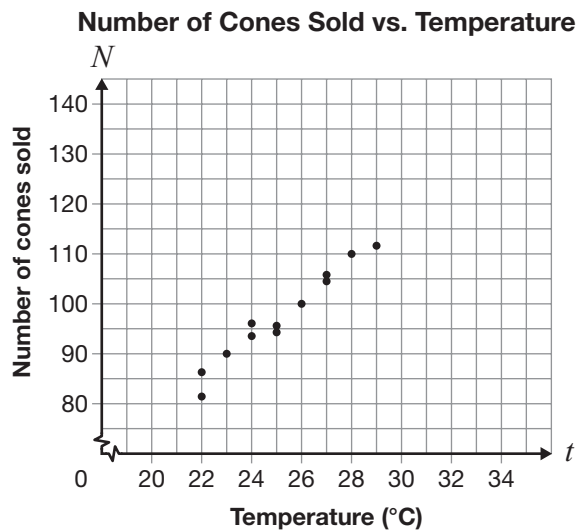
**Hint:**

$$A = \frac{bh}{2}$$

Show your work.

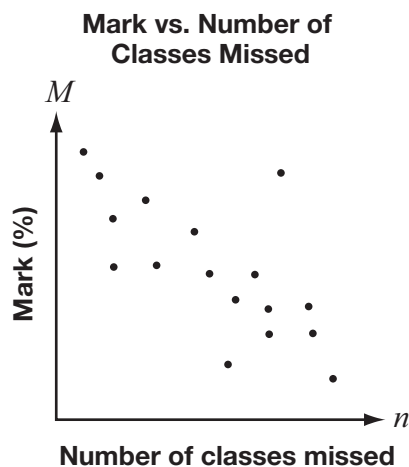
The height of the sail is \_\_\_\_\_.

- 10** Malia records the number of ice cream cones she sells each day and the maximum daily temperature, as shown on the graph below.



According to this graph, approximately how many ice cream cones will Malia sell on a day when the maximum temperature is  $36^{\circ}$ ?

- a 80  
b 110  
c 115  
d 135
- 11** This graph shows the relationship between students' marks and the number of classes that they have missed.



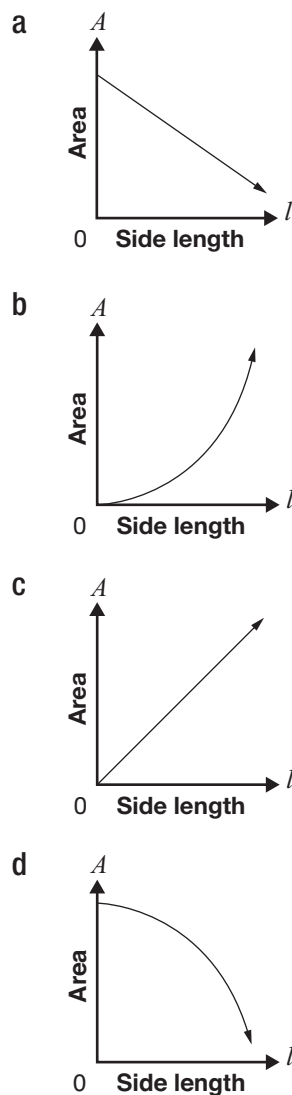
Which line of best fit is most appropriate for the data?

- a
- b
- c
- d

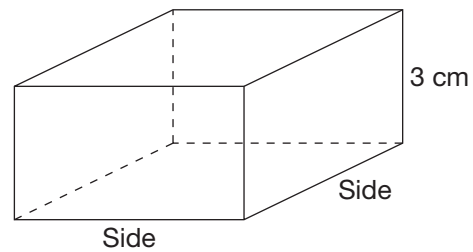
- 12** A student creates a table to show the relationship between the side length of a square and its area.

Side length	Area
1	1
2	4
3	9
4	16
5	25

Which of the graphs below best represents this relationship?



- 13** The square-based prism below has a height of 3 cm.



**Hint:**

$$V = (\text{area of base})(\text{height})$$

Which table represents the relationship between the side length and the volume of this prism?

a

Side length (cm)	Volume (cm <sup>3</sup> )
1	3
2	12
3	27
4	48
5	75

b

Side length (cm)	Volume (cm <sup>3</sup> )
1	3
2	6
3	9
4	12
5	15

c

Side length (cm)	Volume (cm <sup>3</sup> )
1	1
2	4
3	9
4	16
5	25

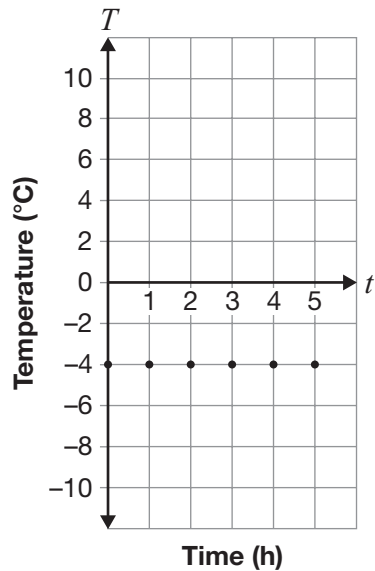
d

Side length (cm)	Volume (cm <sup>3</sup> )
1	1
2	8
3	27
4	64
5	125

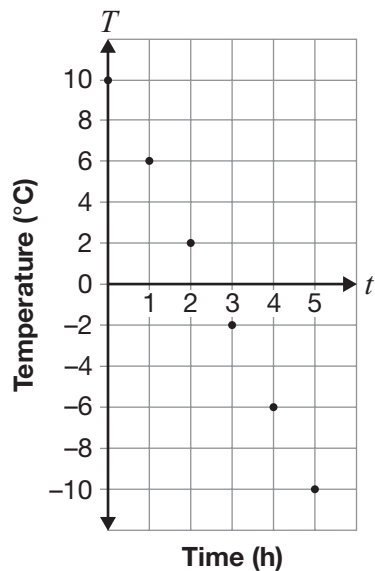
**14** The following graphs represent a linear relationship between temperature and time.

Which graph has a rate of change of  $-4\text{ }^{\circ}\text{C}$  per hour?

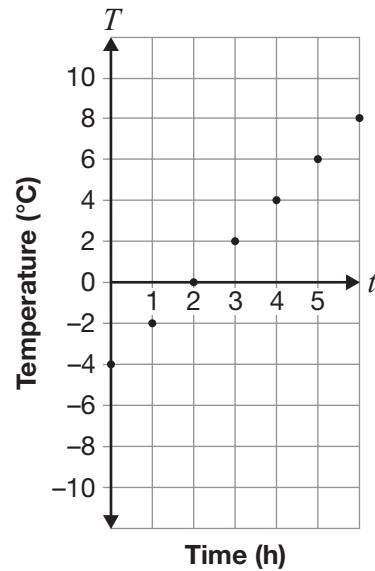
**a** Temperature vs. Time



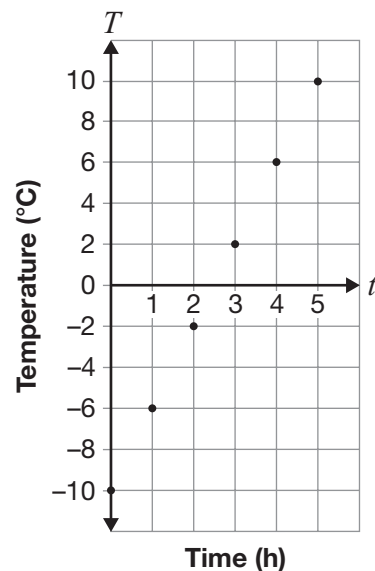
**b** Temperature vs. Time



**c** Temperature vs. Time



**d** Temperature vs. Time



- 15** Sarah is running a 40 km race at a steady pace of 10 km/h.

Which equation represents the distance Sarah has left to run after she starts if  $D$  is the distance in kilometres and  $t$  is the time in hours since she started the race?

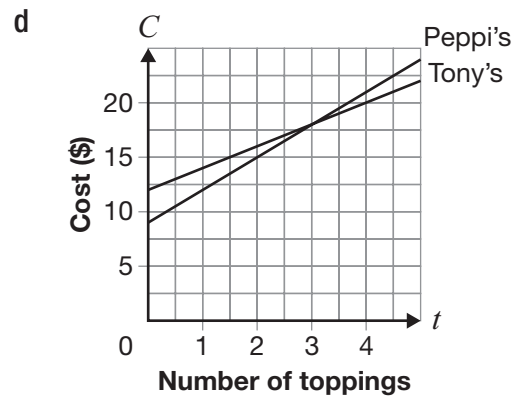
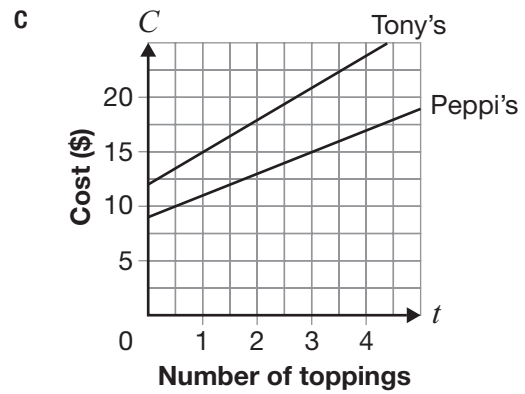
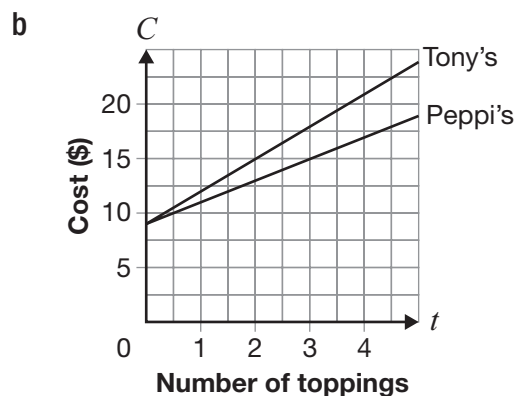
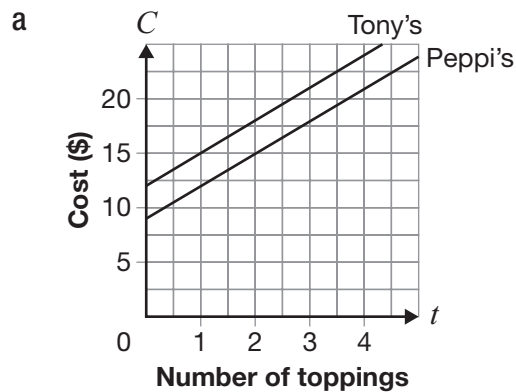
- a  $D = 40 - 10t$
- b  $D = 40 + 10t$
- c  $D = 10 - 40t$
- d  $D = 10 + 40t$

- 16** The equations for the cost of a pizza at two restaurants are shown below, where  $C$  represents the cost in dollars and  $t$  represents the number of toppings.

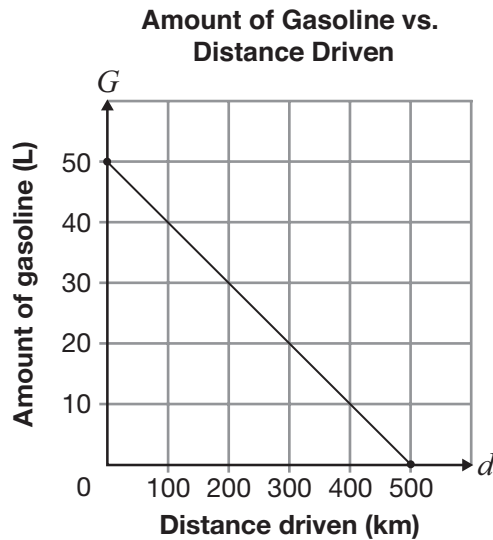
Peppi's Pizzeria  $C = 9 + 3t$

Tony's Pizza  $C = 12 + 2t$

Which graph best represents the cost of a pizza at each restaurant?



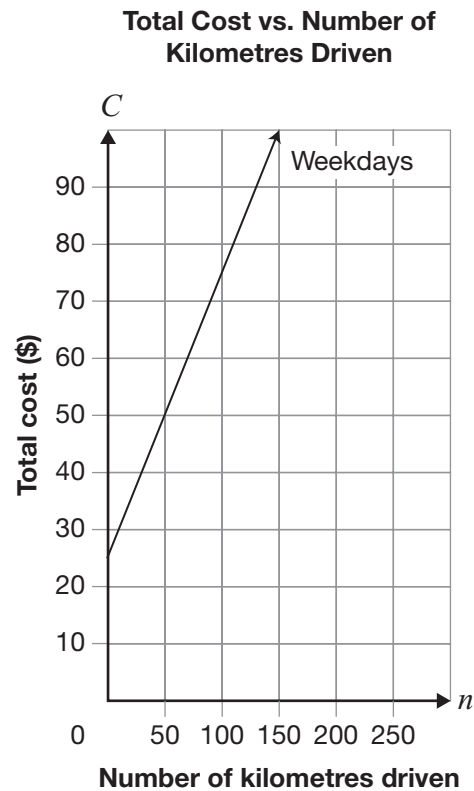
- 17** The graph below illustrates the relationship between the distance driven and the amount of gasoline in the tank of a car.



How many litres of gasoline are in the car's tank when the distance driven is 300 km?

- a** 10  
**b** 20  
**c** 40  
**d** 50
- 18** One day, the temperature at 5 p.m. is  $4^{\circ}\text{C}$ . For the next 6 hours, the temperature drops  $2^{\circ}\text{C}$  every hour. What is the temperature at 11 p.m.?
- a**  $2^{\circ}\text{C}$   
**b**  $-2^{\circ}\text{C}$   
**c**  $-6^{\circ}\text{C}$   
**d**  $-8^{\circ}\text{C}$

- 19** The total cost of renting a car on weekdays is represented by the graph below.



On weekends, the flat fee remains the same but the cost per kilometre is less.

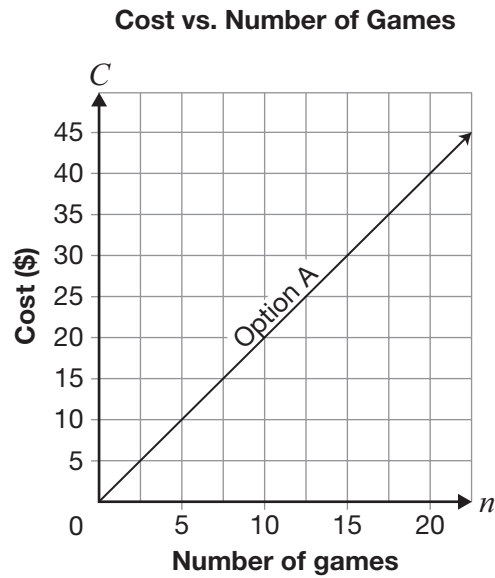
Which of the following statements is true about the graph for weekends?

- a** The weekend graph goes through the point (0, 0).  
**b** The weekend graph stays the same as the weekday graph.  
**c** The initial cost is the same but the weekend graph is steeper than the weekday graph.  
**d** The initial cost is the same but the weekend graph is less steep than the weekday graph.



- 20** Parallel Pines Bowling Alley offers two options.

A graph representing the cost of Option A is shown below.



Option B charges \$30 for unlimited bowling.

Which of the following is true?

- a Option A is always cheaper.
- b Option B is always cheaper.
- c Option A is cheaper for fewer than 15 games.
- d Option B is cheaper for fewer than 15 games.



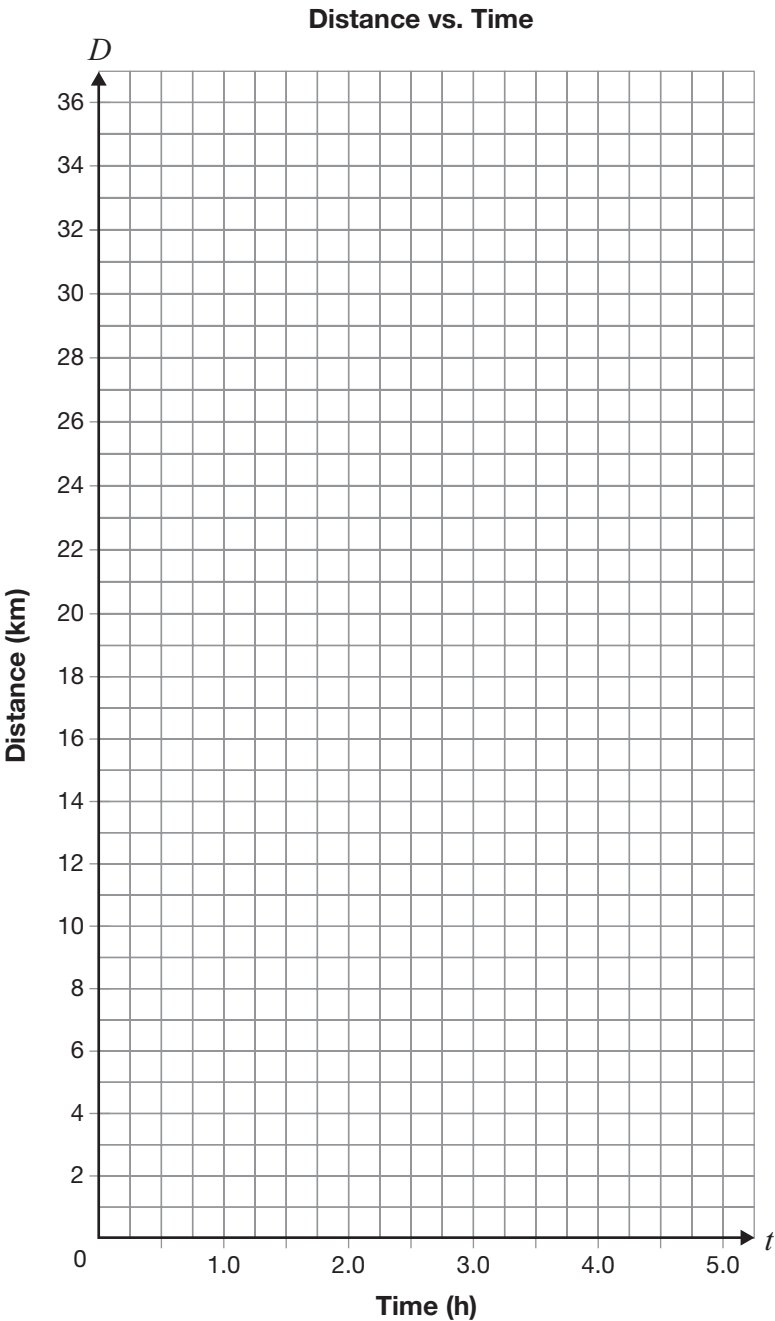
21 **Marathon Man**

Manny is running a race at a constant rate. He records his distance from the starting line at particular times as shown below.

Complete the table for this linear relationship.

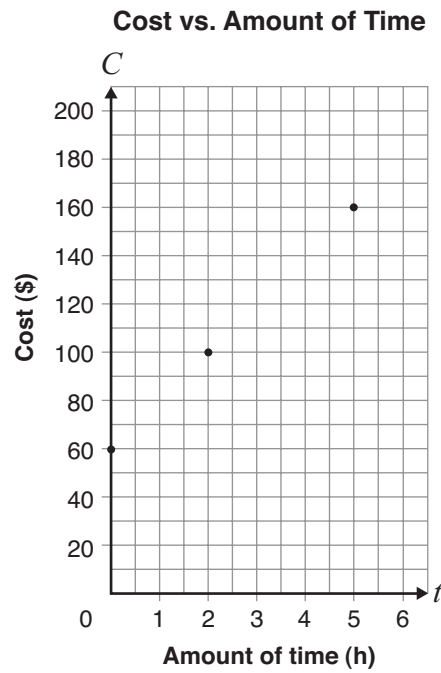
Time, $t$ (h)	Distance, $D$ (km)
0.5	3.5
1.0	
1.5	10.5
2.0	14.0
3.0	
5.0	

Graph this relationship on the grid.



**22 Gym Time**

The graph below shows the relationship between the cost of renting a gym and the amount of time the gym is used.



Determine the hourly rental rate.

The hourly rental rate is \_\_\_\_\_.

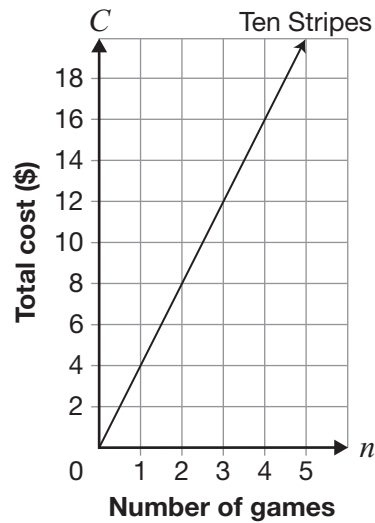
Show your work.

23 Bowling Variations

There are two bowling alleys in town.

The total cost of bowling at Ten Stripes Bowling is represented by the graph below. Ten Stripes offers free shoe rental.

Total Cost vs. Number of Games

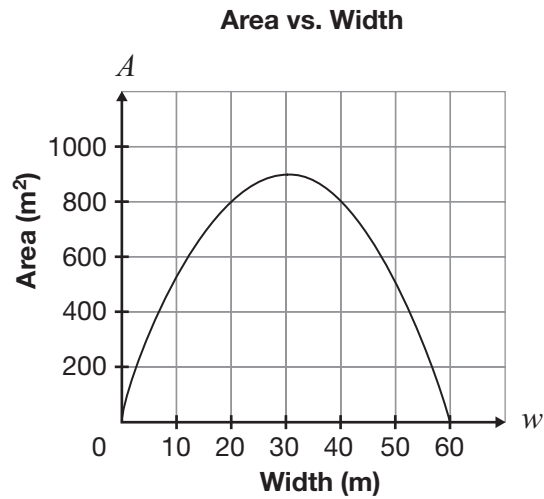


The total cost of bowling at Supreme Bowling is \$4 for shoe rental plus \$3 per game.

Complete the chart.

Ten Stripes Bowling	Supreme Bowling
The initial value is _____.	The initial value is _____.
Circle one: Direct variation      Partial variation	Circle one: Direct variation      Partial variation
Justification of choice of type of variation:	Justification of choice of type of variation:

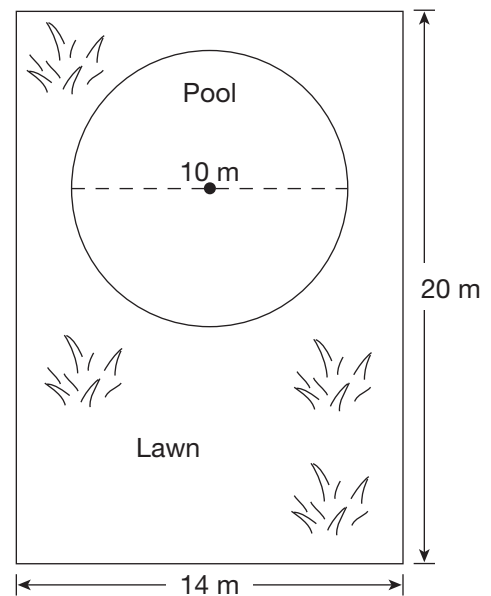
- 24** A rectangle is to have a perimeter of 120 m. The graph below shows the relationship between the area of the rectangle and its width.



What is the width of the rectangle with the largest area?

- a 30 m
- b 60 m
- c 120 m
- d 900 m

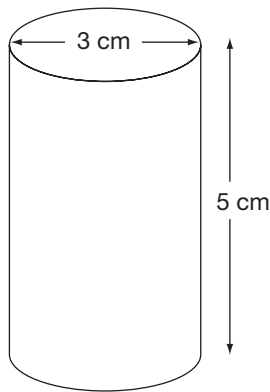
- 25** Gordon has a circular pool in his backyard, as shown below.



Which of the following is closest to the area of the lawn surrounding the pool?

- a  $33.5 \text{ m}^2$
- b  $34.2 \text{ m}^2$
- c  $201.5 \text{ m}^2$
- d  $248.6 \text{ m}^2$

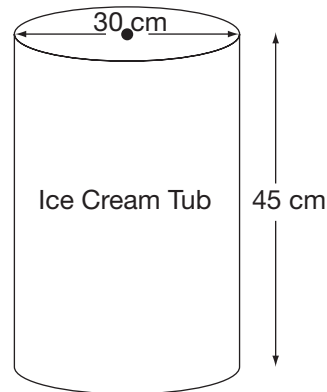
- 26** The water container below needs to be filled.



Which of the following represents the volume, in  $\text{cm}^3$ , of water that fills the container?

- a  $V = \pi(3^2)(5)$
- b  $V = \pi(1.5)(5)$
- c  $V = \pi(2 \times 3)(5)$
- d  $V = \pi(1.5)^2(5)$

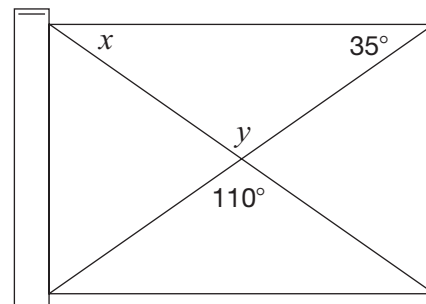
- 27** An ice cream shop sells ice cream cones that each contain an average of  $525 \text{ cm}^3$  of ice cream. The ice cream is served from the following cylindrical tub.



About how many cones can be made from a full tub of ice cream with the dimensions shown?

- a 8
- b 16
- c 60
- d 242

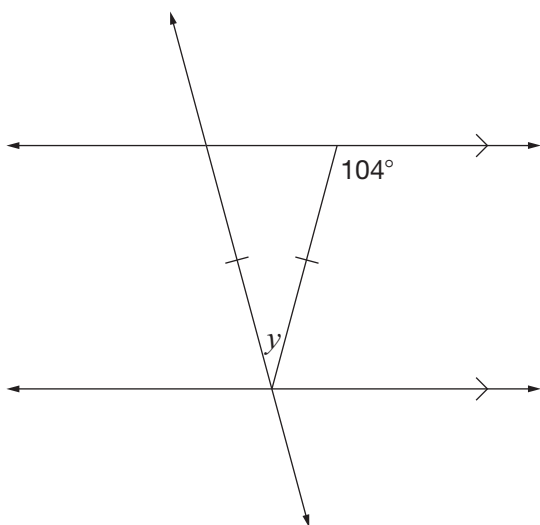
- 28** A carpenter is building a rectangular gate for a fence, as shown below.



What are the values of x and y?

- a  $x = 35^\circ, y = 110^\circ$
- b  $x = 35^\circ, y = 145^\circ$
- c  $x = 55^\circ, y = 110^\circ$
- d  $x = 55^\circ, y = 145^\circ$

**29** Consider the diagram below.



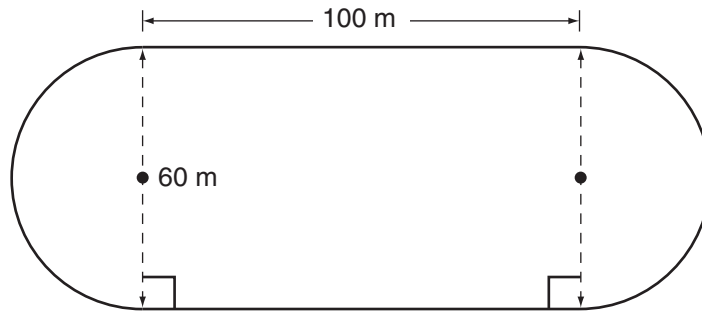
What is the value of  $y$ ?

- a  $28^\circ$
- b  $76^\circ$
- c  $104^\circ$
- d  $152^\circ$



**30 Get Trackin'**

Ashley runs around the following track.



How many times must she run around the track in order to run a total distance of 4 km?

Show your work.

**Hint:**

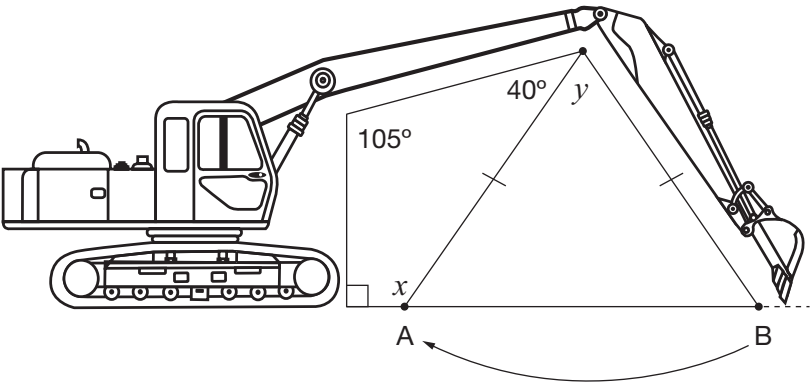
$$1 \text{ km} = 1000 \text{ m}$$





**31 Digging Around**

A hydraulic arm swings from Point B to Point A, as shown in the diagram below.



Determine the values of  $x$  and  $y$ .  
Justify your answers using geometric properties.

Value	Justification
$x =$ _____	
$y =$ _____	



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## Sample Assessment Questions: Applied

### Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, use an **HB pencil to fill in the circle completely**, as shown:

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- If you fill in more than one answer to a question, the question will be scored zero.
- If you leave a question blank, the question will be scored zero.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
6. (a) (b) (c) (d)
7. (a) (b) (c) (d)
8. Respond in booklet.

9. Respond in booklet.
10. (a) (b) (c) (d)
11. (a) (b) (c) (d)
12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)
15. (a) (b) (c) (d)
16. (a) (b) (c) (d)

17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. Respond in booklet.
22. Respond in booklet.
23. Respond in booklet.
24. (a) (b) (c) (d)

25. (a) (b) (c) (d)
26. (a) (b) (c) (d)
27. (a) (b) (c) (d)
28. (a) (b) (c) (d)
29. (a) (b) (c) (d)
30. Respond in booklet.
31. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_





